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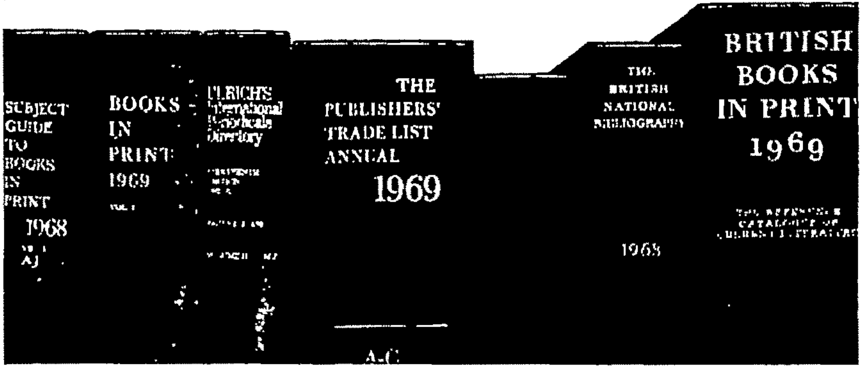
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ASLIB CALENDAR 1971

February

TUE.16.	Midlands Branch afternoon workshop: 'Innovations in libraries'. Arden Hotel, Birmingham. 2.30 p.m.
WED.17.	Aslib Evening Meeting. 'Systems Research' by Dr Gordon Pask. Imperial College, London. 5 for 5.30 p.m.
FRI.19.	Technical Translation Group meeting and lecture: 'Training translators for international organizations', by Professor J. Coveney. Aslib. 3 p.m.
THU.25.	Aslib Visit to NRLSI, Bayswater Division, London W2. 4.30 p.m.

March

MON.8.	Transport Group Annual General Meeting, sherry party and evening lecture. Aslib. 5 p.m.
WED.10.	Engineering Group one-day meeting: 'Information for metrication'. Aslib. 10.30 a.m.
WED.17.	Aslib Evening Meeting. 'The Scottish Poisons Bureau', by Dr H. Matthew. Imperial College, London. 5 for 5.30 p.m.
MON.22.	Computer Applications Group Circulation Working Party. Repeat of one-day symposium: 'Computer-aided systems'. Aslib.
THU.25.	Midlands Branch Annual General Meeting, sherry and buffet. Engineering and Building Centre, Birmingham. 7 p.m.
MON.29–WED.31.	Transport Group Course: 'Effective library management'. Missenden Abbey, Bucks.
WED.31–FRI.2.	Chemical Group Conference: 'Infochem' 70s'. University of Surrey, Guildford.

April

THU.15–FRI.16.	Co-ordinate Indexing Group Annual Conference: 'Thesauri: construction, development and evaluation'. University of Surrey, Guildford.
MON.19–WED.21.	Chemical Group course: 'The nature and language of chemistry'. Courland Grove Hall, Wandsworth.
WED.21.	Aslib Evening Meeting. 'Controlled circulation journals', by R. J. Findlay and W. Streatfield (Morgan-Grampian Ltd). Imperial College, London 5 for 5.30 p.m.
	Chemical Group Annual General Meeting and lecture: 'A Canadian's view of the UK information scene', by Dr F. W. Matthews (ICI). Rembrandt Hotel, London. 11.15 a.m.
THU.29–SAT.1.	Midlands/Northern Branch Joint Conference. Royal Cambridge Hotel, Cambridge.

New members

CORPORATE

(*specialized Group interests are given after names, where relevant*)

Name	*Locality*	*Representative*
Jones, Lang & Wootten	London	Mrs D. Todd
Kwikform Ltd (*Chem*, *Eng*)	Birmingham	G. Cann
Marketing Improvements Ltd (*Aero*, *AVG*, *Bio*, *Chem*, *Econ*, *Eng*, *Tex*)	London	E. Hutchinson
Morgan Grampian Ltd (*Aero*, *Bio*, *Co-ord Index*, *Eltron*, *Eng*)	London	W. Streatfeild
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Ministry of Defence, Haifa (*Aero*, *Eltron*, *Eng*)	Haifa, Israel	U. Bloch
Consiglio Nazionale delle Richerche—Istituto di Chimica delle Macromolecole (*Chem*)	Milan, Italy	G. Zerbi
Universiti Kebangsaan (*Bio*, *Chem*, *Econ*)	Kuala Lumpur, Malaysia	A. A. S. Mydin

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P. Leggate	Oxford
Rhys Matthews (*TTG*)	Sussex
J. E. North (*Bio*)	London
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Mrs C. Amundson	Minneapolis, Minn.
Mrs R. Dooley	West Palm Beach, Fla.

Commonwealth Index of Unpublished Translations

The Translations Department at Aslib wishes to remind users of the Commonwealth Index to Unpublished Translations that we are in part dependent on them to ensure accuracy of our records. In cases where the Translations Department has supplied the location for a translation, but knowledge of the existence of the translation is denied by the organization concerned, upon direct application by the enqurer, the enquirier should *at once* give details of the unsuccessful application to the Translations Department.

It is sometimes possible for us to suggest alternative locations, and the information helps us to keep accurate records. Not infrequently it has happened, as in a recent instance, that the copy of the translation in fact exists and that all that is required is a slight jogging of the holder's memory—which Aslib is quite happy to do!

Chemical Group course: The Nature and Language of Chemistry

Following the success of the two previous courses in Basic Chemistry, the Chemical Group committee has organized another course especially for those who have no chemical knowledge at all. The lecturers will be Mr T. C. Blackler and Mr M. Franks of the Polytechnic of the South Bank.

The topics will include: Fundamental Concepts, Inorganic Chemistry, Organic Chemistry, Physical and Analytical Chemistry, Industrial Chemistry. The lecturers have said that the coverage will be broad rather than deep and that no attempt will be made to teach chemistry as such.

The course will be held at Courtland Grove Hall, Wandsworth, London, from 19th to 21st April. Full board and accommodation have been arranged, beginning with a sherry party and supper on the evening of 18th April.

The inclusive fee for the course is £16. If you wish to attend, please apply to Dr H. C. Evans, Education Officer, Aslib Chemical Group, Shell Research Ltd, Carrington Plastics Laboratory, Urmston, Manchester M31 4AJ. The Education Officer will be pleased to supply any further information.

Co-ordinate Indexing Group Conference

The second annual conference of the Co-ordinate Indexing Group will be held from Thursday, 15th April, to Friday, 16th April 1971 at the University of Surrey, Guildford.

The theme of the conference is 'Thesauri: Construction, Development and Evaluation' and papers will be devoted to constructing thesauri for building and for local government, Thesaurofacet; the need for structure and evaluation, and retrieval performance. The first day will end with the conference dinner followed by a series of problem symposia organized by subject fields.

The conference fee, including meals and accommodation, is £10. A limited number of places are available to students at a reduced fee of £6. The Conference Secretary is Mr R. M. Rostron, c/o Hutton and Rostron, 42 Claremont Road, Surbiton (telephone 01-399 3387/8).

A selective bibliography on measurement in library and information services

Aslib Publications has recently published *A selective bibliography on measurement in library and information services*, compiled by Rose Reynolds of the Aslib Research Department. This list, based on material held in the Aslib Library, deals with cost and costings in library services and was originally compiled for use within the Research Department. Besides listing works on, for example, cost accounting in libraries, costs of abstracting, acquisition, catalogue maintenance, mechanization, microfilming, and many other library procedures, the bibliography also makes reference to material on related measurements, such as times and planning measures. It is available from the Aslib Publications Sales

Department at a reduced rate of 30*p* (6*s*) to Aslib members, and 40*p* (8*s*) to others.

Construction Industry Information Group

The Construction Industry Information Group, founded in 1962, under the auspices of the Royal Institute of British Architects, with a membership at the first general meeting of 20, has grown to a 250-strong independent group of librarians, information officers, and others interested in information work in the industry.

Membership covers all sections of the industry, and through a developing network of Branches, regional interests can be coped with via local meetings. At present Branches exist in London, N. Ireland, Scotland, Midlands and the North-West, but scope for local and personal contact exists whenever a handful of librarians can get together to discuss common problems. This was the basis of the original Group.

The first issue of the Construction Industry Information Group *Bulletin* has just appeared. It is planned as a quarterly journal, free to members, and available on subscription to non-members (price £4 p.a.). It succeeds the duplicated *Newsletter,* published by the Group over the past three years.

The aim of the new journal, apart from acting as a communication medium to the members, is to provide full length articles on librarianship and information activities within the construction industry. The first issue includes an article on the history of the Group, as well as articles on 'Slide collections', 'Building Centre information services', 'Data co-ordination', 'CIRIA information services'. As the Chairman of the Group, Mr Charles Rogers (who is also the Hon. Treasurer of Aslib), says in his introduction, 'this is the first journal to be devoted solely to information handling matters within the construction industry'.

Aslib and the CIIG are co-operating in the organization of a three- or four-day course on Information for the Construction Industry, to be held at Aslib in the week beginning 22nd March 1971. Programmes and application forms have been distributed with this issue of *Proceedings.*

LISA's subject arrangement

The recommendations of a Sub-Committee set up to consider the use of the Classification Research Group's Classification of Library Science in *Library & Information Science Abstracts* have now been accepted by the Library Association's Publications Committee. From 1971, the scheme will continue to be used as the basis for the arrangement, but processes and stock will be the leading facets rather than types of libraries and library users. This means that abstracts on compound subjects such as cataloguing in university libraries and microforms in public libraries will be entered under cataloguing and microforms respectively and not under the type of library. The feature headings will be in the following form:

Cataloguing. University libraries
Microforms. Public libraries

and backing alphabetical subject index entries will be provided at:

University libraries: Cataloguing
Public libraries: Microforms

A recommendation to make the annual cumulation of the alphabetical subject index lead to serial numbers of abstracts rather than to the notation of the scheme has also been accepted. Alphabetical subject indexes to individual issues will continue to lead to the scheme's notation.

International Federation of Library Associations (IFLA)

The 37th Conference of IFLA will be held this year at the City Central Libraries and St George's Hall, Liverpool, from 27th August to 4th September. The theme of the conference will be 'The organization of the library profession'.

Special international exhibitions on Library Technology and Library Suppliers, and on 'Library Associations: their history, services and publications' have been arranged, as have a number of receptions, visits and excursions. Papers will be made available in advance in four languages: English, French, German and Russian. It is also hoped to hold a Unesco Seminar, which will precede the conference, on the latest achievements in advanced librarianship.

Application forms, which should be returned no later than 1st May, are obtainable from: IFLA Conference Office, Liverpool City Central Libraries, William Brown Street, Liverpool L3 8EW.

National Central Library

NATIONAL CENTRAL LIBRARY. 54th Annual report of the Executive Committee for the year ending 31st March 1970.

The major event in the year under review was undoubtedly the publication of the Report of the Committee on National Libraries (Dainton Report). The Trustees expressed approval of what they considered to be the two main recommendations of the Report, i.e. the establishment of a National Libraries Authority and the situation of the National Reference Library in central London. They disapproved of the bias in favour of improving library services in science and technology rather than in the humanities and social sciences. It was also felt that any reorganization of the lending services should be deferred until a National Libraries Authority had been set up and had been able to conduct a full survey of the needs of the situation. The decision, since publication of the Report, to institute a feasibility study of the use of computers in the national library service, was felt by the Trustees to be a step in the right direction. At the end of the financial year no announcement had been made by the Government regarding the Dainton Report.

There was a substantial increase in the number of loan applications received by the NCL, the university libraries continuing to be the chief users of the Library's services. A marked increase in loans made from the NCL's own stock was partly due to the increase in the book fund in this and the previous year, and also to the transfer of part of the East Midlands Regional Bureau to the NCL.

The Outlier libraries, which are mainly special libraries, continued to lend books through the NCL. There are now 400 outliers and the Report again mentions that the Library would be glad to include in this list any special library which is prepared to make its collection available through the NCL.

Space Documentation Service

The Space Documentation Service (SDS), set up in 1965 by the European Space Research Organization (ESRO) and the European Space Vehicle Launcher Development Organization (ELDO), is designed to ensure that European engineers and scientists have easy access to the scientific and technical results generated in the course of space programmes. The basis of the system is an exchange agreement whereby NASA makes available to SDS information published in *STAR* (*Scientific and Technical Aerospace Reports*) and *IAA* (*International Aerospace Abstracts*) since 1962, in magnetic tape form, and also makes available microfiches of the documents for dissemination.

Dissemination of this information in Europe is made possible by the installation of a new high-speed information retrieval system, RECON (Remote Console), developed by NASA. This allows the user to formulate simple or complex search requests via a remote, visual display terminal with keyboard coupled to the ESRO computer in Darmstadt, Germany. The database now consists of some 500,000 document references and receives 6,000 additions per month.

SDS offers five basic services: retrospective bibliographies to 1962; a monthly SDI service; standard profiles; industrial topics; and a document reproduction service. Reduced rates for the services are allowed to government-sponsored establishments in the Member States which participate in ESRO or national space programmes. Industrial users are charged according to the services they use.

NASA agreement has been obtained to extend the existing terminal network to provide direct links with the national documentation centres of Member States. The Department of Trade and Industry's Reports Centre at St Mary Cray has been hooked into the network and is already operational.

Further information about SDS can be obtained from: ESRO, 114 Avenue de Neuilly, Neuilly-sur-Seine, France.

Drug Literature Index

As announced in the April 1970 issue of the *Proceedings*, Drug Information Systems of London have been co-operating with the Excerpta Medica Foundation in the production of the *Drug Literature Index*. Volume 1 of the *Index* comprising 30,000 citations, plus indexes from journals received in Amsterdam from January 1969, is now available. Volume 2 comprising the balance of 1969 and most of 1970 citations will be available early in 1971. The cost of each volume is $750. Volume 3 will be published monthly beginning January 1971 at an annual subscription rate of $1,000. Further details from: Excerpta Medica Foundation, 2 Queen Anne Street, London W1.

Library of Congress to use Dewey 18

In a recent press release the editor of the *Dewey Decimal Classification*, Mr Benjamin A. Custer, announced that, beginning on 1st January 1971, the

Library of Congress will assign Dewey Decimal numbers from the forthcoming 18th edition of the *Dewey Decimal Classification*, and print the results on catalogue cards and in book catalogues, as well as record them on the MARC tapes. Mr Custer goes on to say:

'The 18th edition of Dewey is now in the press, and is expected to be published in mid-1971 by Forest Press, Inc. from its new address, 85 Watervliet Avenue, Albany, New York 12206, USA. Although libraries utilizing LC's bibliographic services may thus receive classification numbers, the meanings of which have not yet been published, they will enjoy the advantage of early use of many important new expansions, such as those for mathematics, law, economics, nuclear physics, the biological and medical sciences, history, and geography.

The Library's decision to apply the provisions of DC 18 before publication is based on a desire not only to take early advantage of an edition of Dewey deemed superior in many respects to DC 17, but also to promote international co-operation through co-ordination with the *British National Bibliography*, which has already decided to use DC 18 on 1st January with the beginning of its new five-year cumulation, 1971–1975

When the 18th edition is available, announcements will appear in the professional press.'

33rd Annual Meeting of ASIS

Over 1,200 scientists, engineers and librarians were present at the 33rd Annual Meeting of the American Society for Information Science held in Philadelphia on 11th–15th October 1970. The theme of the conference was 'The information conscious society' and subjects of the papers presented at the sessions included: SATCOM, the future of information science, information retrieval for humanities research, foreign developments in information science, the ethical and moral issues of information science, the UNISIST study, and the sociological foundations of information science.

General Chairman of the conference was Dr Eugene Garfield (ISI), and Professor Derek J. de Solla Price (Yale University) served as Technical Programme Chairman.

Among award winners announced at the conference were Mr Cyril W. Cleverdon, Librarian of the Cranfield Institute of Technology (and a member of the Council of Aslib), who received the ASIS Award of Merit, and Mr F. Wilfred Lancaster of the Graduate School of Library Science, University of Illinois (and formerly a member of the staff of Aslib), who received the award for the best book on information science.

The annual meeting of ASIS this year will be held in Denver, Colorado. Society headquarters are at 1140 Connecticut Ave., NW, Washington DC.

LA Wheatley Medal for Indexing

The Library Association has revised the conditions for the annual award of the Wheatley Medal for an outstanding index. In order to increase the number of entries, recommendations are now invited from publishers and others, whereas previously they were restricted to 'members of the Library Association and the

Society of Indexers'. Recommendations will be judged by a panel representing the Society of Indexers and the Cataloguing and Indexing Group of the Library Association, the final decision being subject to confirmation by the Chairman of the LA's Publications Committee. Recommendation forms are available from the Editor of Publications at the LA (7 Ridgmount Street, London WC1E 7AE), to whom they should be returned no later than 15th February 1971.

Contents of Recent Economics Journals

Contents of Recent Economics Journals, which began publication in January 1971, is a weekly current awareness service covering all aspects of theoretical and applied economics. It consists of facsimile reproductions of the tables of contents of about 140 of the world's leading scholarly journals—limited in the first instance to those written solely or partly in the English language. Emphasis is being laid on speed in dissemination, so that facsimiles of the tables of contents of all the issues received during one week are being mailed to subscribers during the following week.

It is being prepared in the Central Library of the Department of Trade and Industry (formerly the Board of Trade Central Library), and is being published by HM Stationery Office, PO Box 569, London SE1. Subscription is £6 in the British Isles, £7.25 to other countries by surface mail.

Medical Library Association Fellowships

The American Medical Library Association is currently inviting applications from abroad for fellowships in two types of study programmes: (1) a year's study course in which attendance at an approved library school is combined with a limited amount of travel, and (2) a course of six months working in various US medical libraries, sometimes with attendance at a six week summer session course in medical libraries.

A monthly stipend, tuition and travel in the USA are provided, but candidates should seek funds for travel to the US from other sources. Applicants should be working in, or preparing to work in, a medical library. Further information from: Committee on International Co-operation, Medical Library Association, Suite 2023, 919 N. Michigan Avenue, Chicago, Ill. 60611.

Slovak Academy of Sciences

We have recently received from the Central Library of the Slovak Academy of Sciences a short list of twenty-four books, taken from the 44th Aslib Annual Conference Catalogue, which the Academy would like to have either as a gift or on an exchange basis. If any member, who may have a personal interest in Czechoslovakia, would like to see a copy of this list with a view to their sending these publications direct to the Academy in Bratislava, then they are invited to contact the Editor of *Proceedings* at Aslib.

People and places

MR GEOFFREY WHATMORE has been appointed to the new post of Chief Librarian of the IPC Newspaper Division. He will be responsible for the management of the Division's national newspaper libraries with an advisory responsibility to other newspaper Division companies. Mr Whatmore was formerly Head of Libraries and Information Retrieval projects at IPC Research and Development.

MR JAMES A. DEARDEN, Senior Lecturer in the Department of Bibliographical Studies at the College of Librarianship Wales, has been awarded the Cowley Prize of University College, London. This prize is awarded annually for the best MA thesis in library studies at the University of London.

Aslib Cranfield Research Project

Readers are asked to note that the *Interim report on the test programme of an investigation into the comparative efficiency of indexing systems* (Cranfield, College of Aeronautics, 1960), which is listed in the latest Aslib Publications catalogue, is now out of print.

BRIEF REVIEWS

HENDERSON, G. P. *and* HENDERSON, S. P. A. *eds.* Directory of British Associations. 3rd edition, 1971–72. Beckenham (Kent), CBD Research, 1970. 328 p. £6. (SBN 900246 07 3)

This is the third edition of the directory first published in 1965. The important factor to bear in mind is the introduction of the supplementary directory, published by CBD, entitled *Councils, Committees and Boards,* to which entries for several hundred bodies have been transferred from the last edition; there are references to those bodies now in CCB which were previously in DBA. Nevertheless, the number of entries has been greatly increased; more bodies of local interest, British Chambers of Commerce abroad and specialist societies in medicine and technology have been included. Otherwise the scope is the same as in the last edition, with the same format, form of entry and abbreviations in the publications, abbreviations and subject indexes, as well as the main alphabetical section. This directory is an admirable example to anyone in information work of a useful and usable tool.

NAYLOR, M. *ed.* Financial Times Yearbook 1970/71. London, Longmans, 1970. 405 p. £3.75 (75*s*). (ISBN 0 582 12654 1)

This is the 2nd edition of the *Yearbook.* The layout and order appear to be much the same as in the previous volume although headings are clearer. A fairly detailed contents list has been included which should make the information more accessible. There is still no subject index, however, which would be particularly useful for the United Kingdom and international sections, nor is there an alphabetical index to countries or organizations. Most of the information has been updated and paragraphs on taxation and labour relations have also been included for most countries.

WHO'S WHO OF BRITISH ENGINEERS 1970–71. 3rd edition. London, Lyon Grant and Green, 1970. 755 p. £12. (SBN 85492 0011 0)

Following the same lines as the previous edition, the entries in the third edition are arranged alphabetically under the biographee and include details of special interests, qualifications, publications and address. All the information has been supplied by the individual concerned. Once again there are lists of abbreviations used, details of professional institutions, and of British engineering and allied publications referred to in the text. The list of engineers classified under their specialized interests has however been omitted in this edition.

USER STUDIES
A REVIEW OF THE LITERATURE FROM 1966 to 1970

D. N. WOOD

National Lending Library for Science and Technology

Paper presented at the 44th Aslib Annual Conference, University of Aberdeen, 20th–23rd September 1970

MY TERMS of reference when asked to prepare this review of user studies were to bring Fishenden's work[1] up to date. This was published in the *Journal of Documentation* in September 1965 and in his paper he looks at a limited number of British use studies and draws some broad general conclusions relating to the development of a national information service. The present paper which covers the literature back to the beginning of 1966 is somewhat more detailed. It considers a wide range of investigations into the information gathering habits of scientists, engineers, social scientists and others, and reports results which it is hoped will provide managers with information on which to develop policies regarding library and information services at all levels. Although an increasing number of studies is being carried out in Eastern Europe and in the USSR there has been no major work reported and consequently the review considers mainly British and American investigations.

Apart from the Fishenden paper a number of reviews and bibliographies cover user studies prior to 1966. The principal works are those by Menzel,[2] Davis and Bailey,[3] Paisley,[4] DeWeese[5] and Weinstock *et al.*[6] The scale of the pre-1966 activity can be gauged from the fact that the DeWeese bibliography contains 547 references.

Since 1966 the *Annual Review of Information Science and Technology* has contained a yearly review of 'Information Needs and Uses'[7, 8, 9, 10] and although these tend to be somewhat selective and to reflect the interests of the reviewers, they provide a useful means of keeping up to date with major developments.

An over-view of the whole field of user investigations during the last five years reveals little change in the basic methodology employed. The self-administered questionnaire often backed up before, and sometimes after, by interview, remains the principal means of collecting data regarding information transfer as a whole. For the study of literature use alone, however, indirect methods such as the counting of citations or the analysis of loan records seem to have been preferred. Although the general methodology remains the same there are noticeable and welcome improvements to be seen in detailed methodology. Samples have been chosen more scientifically, questions have been constructed with more thought, the critical incident technique has been applied more often and opinions have been sought less. Also noticeable over the half decade is the way that the results of many use studies have been subjected to rigorous statistical treatment.

If there is one general criticism on the methodological side it is that too few investigators seem to have been worried by low responses in questionnaire studies. With one or two exceptions this averages about 60% in the case of mail questionnaires and 75% where the investigation has been carried out internally. Seldom does there appear to have been a concerted effort to retrieve those questionnaires which have not been returned within a week or two; this despite the fact that in one case[11] where a double follow-up was done for a mail questionnaire the response rate reached 86%. Furthermore there appears to have been a uniform failure to attempt to contact non-respondents in order to establish whether they were distinctive or random sub-populations.

Another important feature of the last five years has been the appearance of reports dealing with information transfer in the social sciences. Before 1965, as Paisley[4] discovered when he set out to review the research literature on 'The Flow of Behavioural Science Information', most of the reported use studies were in the fields of science and technology. The relatively recent interest in the information gathering habits of social scientists is due to the social scientists themselves entering the field.

In reviewing the literature of the last five years over one hundred use studies have been examined. Many of these however are concerned with such local situations that it is difficult in most cases to see why they have been published at all. This is a criticism which can most often be levelled at library use surveys. The results of such surveys whilst being useful for administrative purposes, can rarely be used to give a national or international picture, since they usually reflect such local conditions as staff/student ratios, interests of academic staff, course requirements, library specialization, existence or otherwise of departmental libraries, library regulations and so on. It is for these reasons that this review will not consider further a number of user studies which have been published.

Also outside the scope of this paper is a consideration of many of the library surveys conducted in connection with reports of UK Government Committees.[12, 13] One reason for this is that many of these are simply descriptions of the libraries concerned and the results they contain have few general applications from a user study point of view. The main reason however is that the reports are the subject of Dr Coblans' paper which follows.

Relative use of information channels

The average scientist and engineer spends an estimated 20–25% of his working time searching for information.[14, 15, 16] Because of this it is obviously desirable that information needs and uses should be studied with a view to improving the overall system of information transfer. This is particularly true at the present time when modern technological developments allow virtually any type of information system to be designed.

A study of the literature describing user studies makes one thing abundantly clear, namely that the flow of scientific and technical information is by no means simple. So many criteria play their part in determining the nature of any one individual's information gathering processes. These include such variants as job function, size of organization, qualifications, place of employment and academic discipline.

All the various channels which are used as means of acquiring information, e.g. journals, books, customers, colleagues, reports, trade catalogues, conferences, advertisements, suppliers, consultants and mass media can conveniently be classified into formal or written, and informal or oral sources.

Some studies have attempted to investigate the use made of all these sources by a large population of workers within a particular discipline. Typical of such was the study made of the information requirements of mechanical engineers,[17] the investigation currently in progress on the information requirements of social scientists,[18] the Aslib study on metals information in Britain,[19] and the study of the information needs of town planners.[20] Broadly based investigations of this kind almost inevitably have to make use of lengthy mail questionnaires (the social science questionnaire runs to twenty pages) which, even if they are completed (in the case of the Aslib study only 3.6% were returned at the first stage), rarely allow one to obtain more than a very general picture of the information gathering process.

More successful seem to have been those studies which look in detail at the use made of a particular channel, e.g. the various Psychological Association studies, or multi-channel studies involving relatively small populations, e.g. the studies carried out by Allen and his colleagues at the Massachusetts Institute of Technology.

Nearly all the investigations that have been reported lead one to conclude that the usefulness of the various information channels is determined by the functional responsibility of the individual. The papers by Gilmore *et al*[21] and Wood and Hamilton[17] both confirm pre-1966 findings that those personnel engaged on research and development (including academic workers) make considerably more use of formal channels, particularly scientific journals and abstracting publications, than do their colleagues involved in industrial production, testing, design, etc. The latter find oral communication[22, 23] (particularly with colleagues in the same organization) to be among the most useful sources of information, whilst the literature they consult is more likely to be a semi-published internal report, a trade publication, a commercial journal or a handbook than a scientific periodical. This is not to say, however, that research workers do not find informal discussion of value. Indeed, Meadows and O'Connor[11] revealed that although journals were their principal sources of information, astronomers and space scientists in the UK rate informal discussions as the second most useful source and over 50% made frequent use of this information channel. This is confirmed by Amsden[14] in the case of anthropologists.

With regard to the relative use of formal and informal sources, it is interesting to note the finding of Slater and Keenan[24] that, superimposed on the patterns referred to above, is the tendency of American workers to make more use of informal channels than their UK counterparts.

An important feature which has been found to have a very definite bearing on the use made of different information channels is the convenience with which they can be used. This is one of the main findings to emerge from the MIT studies. Making use of what he calls a 'solution development record' Allen and his co-workers studied the problem-solving methods of engineers in industrial environments. Each engineer recorded his use of a number of information channels during a period of about fifteen weeks and the investigators then ranked these on the basis of perceived accessibility, perceived ease of use, perceived technical quality and amount of use. The conclusions which have been reported in several places[22, 25, 26] are that the quality of the channel has no bearing on the frequency with which the source is used and that both frequency and priority of use are determined by accessibility. This finding received support from Kenney[27] who, whilst studying the implications of user needs for the design of a catalogue, concluded that 'people do not like to work hard or travel to any extent for their information even at the risk of losing some'. Utterbach[28] and Rosenberg[29] also draw the same conclusion. The latter interviewed ninety-six research and non-research personnel and asked them to rank eight information gathering methods on a 7-point scale according to ease of use and amount of information expected, and to indicate which method they would use to solve three hypothetical problems. The methods arranged in order of preference are:

1. Search personal library
2. Search material in building where you work
3. Visit a knowledgeable person nearby
4. Telephone a knowledgeable person
5. Use a library that is not within your organization
6. Consult a reference librarian
7. Write a letter
8. Visit a knowledgeable person twenty miles away or more

The study revealed an absence of a relationship between preference ranking and the amount of information anticipated. For example, use of one's personal library (although heading the preference list) came 7th in the list of methods arranged in order of anticipated value.

Informal communication

It is not surprising that both technologists and scientists (including social scientists) make considerable use of oral communication. Apart from it being one of the most convenient sources, it allows the searcher to explain personally, clarify and modify his information requirements. Furthermore, and here I quote, 'he can expect a colleague's responses to provide the right information in the right amount and within the time required'.[30] This is certainly not guaranteed when using the literature.

It has already been noted that technologists make more use of oral communication than do research workers. Incidentally this is something they have in common with business executives.[31] This is partly due to the fact that the information most frequently required by technologists relates to procedures, materials, techniques and equipment, i.e. the sort of information which colleagues, suppliers and clients, etc., are most able to provide.

Although it is not of such primary importance, scientists, too, rely on oral communication as a means of obtaining information. This is particularly true at certain stages of a research project. An American Psychological Association study (study 11)[33] found oral communication to be used a great deal at the outset of a project when ideas were being transformed into action, when findings were being interpreted and at the pre-publication stage.

A major reason for scientists using the informal communication network is that information passes through the network anything up to two years before it reaches formal publication. It would appear that the only effective way of keeping up to date with one's subject is to develop a wide range of personal contacts, or in other words become part of what has been termed an invisible college. The concept of the invisible college was first put forward by de Solla Price. Such colleges are supposed to consist of a group of people with similar interests and who use a number of informal communication channels including exchange of preprints, reprints and manuscripts,[34] telephone calls, conversation at conferences (both national and international), local meetings, guest lectures, informal newsletters, and so on. According to Crane[35] colleges are held together by highly influential scientists, usually senior people, who over the years have accumulated a large group of former research students.

The idea of the invisible college consisting of a small community of scientists, each of which is in contact with the others, has been challenged by Mullins.[36] In a study involving 254 biologists, each of which was asked to indicate others with whom he was in contact, Mullins found that the 254 people concerned came from 64 disciplines. He concluded that instead of invisible colleges there exists a core structure of communication linkages. Because each scientist can see only those linkages near to him he does not realize that the network continues in all directions.

Another contribution to the understanding of informal communication was made by Allen in studies already referred to.[22, 26, 37] He and his co-workers discovered the existence in research and development laboratories of what he terms technological gatekeepers. These are people to whom others turn for technical discussion and consultation and who, in turn, report having a greater amount of contact with professional scientific and technical literature and with technically trained friends outside the laboratory. They also attend conferences fairly frequently.

For obvious reasons conferences are not the most frequently used sources of information. The cost of attending them limits all but the most favoured to attending not more than one or two per year. In terms of the amount of information obtained, however, they are apparently a very useful source. During 1966–7 a series of studies was carried out by the Johns Hopkins University's Center for Research in Scientific Communication to evaluate conferences as a communication channel.[38, 39, 40, 41] Using questionnaires administered to authors of papers, attendees and those who subsequently requested reprints of papers, a number of interesting results were obtained. Some of these cast doubts on the value of formal presentations at conferences. In the first place between 50 and 68% of authors reported that oral presentations had previously been made at regional meetings. Secondly, between 32 and 50% had already made written presentations of the same work (usually as a report or thesis) and thirdly between 78 and 94% would be writing the work up for publication as a journal article within three months of the conference. From the attendants' point of view, between

50 and 70% were familiar to some extent with the content of the paper before going to the conference. The studies go on to show that the majority of useful information acquired at conferences is through informal discussion with either authors or other attendants. Between 50 and 60% of the sample reported some effect upon their work as a result of some aspect of the meeting other than the presentations. 35% of authors of papers reported modifications in their work as a result of discussions and 50 to 60% stated that they intended to continue interaction with other workers. Incidentally more than 20% of the contacts made at conferences were found to be new ones.

Sources of references

Before going on to discuss the use of formal written channels of communication it should be noted that the informal system often provides the link between the scientist or engineer and the formal channels. This is particularly true in the case of engineers, most of whom apparently prefer to be referred to a book or journal article by a colleague rather than use such formal methods as an abstracting or indexing journal.[17] This reluctance to use abstracts and indexes is borne out by various library surveys[42, 43] which have revealed very little use of these bibliographic tools. To some extent this can be explained by lack of knowledge (the Parry report[13] for instance revealed that only 37% of British undergraduates knew of the existence of abstracting journals and only 14% had been taught to use them) but the fact that they are inconvenient to use must also play its part.

Some reports which have appeared[44, 45, 46] apparently contradict the above statements. Borrowers of biomedical and social science literature from the National Lending Library were asked to indicate the source of their references. 21% of the social scientists and 30% of the biomedical workers reported that the reference had been obtained from an abstracting journal. The figures were even higher for the very recent literature. Verbal recommendations on the other hand accounted for only 13 and 8.6% respectively. The explanation for this must lie in the fact that the literature borrowed from the NLL is acquired on inter-library loan. It is obtained, therefore, through a library that in most cases does not hold the item. Local research workers, consequently, are less likely to have heard of the item and therefore to have referred their colleagues to it. The NLL studies also ignore the part played by browsing (either along the shelves or through particular journals) in locating information of value. This has been shown[43, 47, 48] to be a major, although admittedly not very efficient, information gathering technique.

It is revealing to note from the NLL studies of biomedical literature use that mechanized information retrieval systems (MEDLARS, CBAC, Ringdoc, etc.) provided very few of the references. Only 2.0% of the biological references and only 4.6% of the medical references came from these sources. Possibly, mechanized services are too remote from users to be used as much as their value might warrant.

Another interesting conclusion to be drawn from the NLL studies is that abstracts do not appear to be any better than titles plus keywords at leading readers to the worthwhile primary literature.

Use of the literature

Despite the fact that Allen[26] found that 'literature is not greatly used and is mediocre at best in its performance', a considerable number of scientists and engineers do make use of it and spend a good deal of their time reading (6–9 hours per week according to two studies[15, 16]). Literature use has been investigated in a number of ways. Questionnaire studies have provided qualitative information on the relative value of different types of literature and lists of the most important journals have sometimes been compiled by analysing responses to such questions as 'Please list those journals which you see regularly'.[17] Analyses of loan records in libraries,[44, 45, 46, 50, 51, 52, 59] citations in books,[54] journal articles[53, 54, 55, 56, 60] and citation indexes,[57] and references in personal card indexes,[58] are other techniques which have been used. Each of these has its merits and drawbacks as discussed by Vickery.[49]

Judging by the use made of them in British technical libraries[61] textbooks (used by 56% of users) followed by periodicals (used by 43%) are the most frequently consulted types of literature. In the same study abstracts and indexes were found to be used by 22% of the population, handbooks and data books by 16% and dictionaries and encyclopaedias by 13%. These however are global figures and it should be pointed out that when the use of literature is considered by discipline and job function different pictures emerge. Scientists, for instance, make heavier use than do engineers of periodicals and abstract journals while using textbooks and data books less. Teachers make above-average use of textbooks and review literature while students, both postgraduate and undergraduate, are also heavy users of textbooks. Undergraduates make the most use of encyclopaedias and make the least use of periodicals. These findings are supported by other studies. Amsden[14] reports that journals are the most used types of literature among anthropologists and 75% of the literature cited by wild-life scientists are periodicals.[60] Research oriented personnel in certain American industries rate journals as the most important sources of information for both current awareness and problem solving, whereas product oriented and technical personnel rate trade publications and textbooks as more useful.[21] Engineers in the American Department of Defense find technical reports one of the best sources of information and receive 16% of their information this way.[30] British mechanical engineers[17] employed on production, design and testing make frequent use of standards, specifications, handbooks and data books compared with their research colleagues. On the other hand they make less use of periodicals. In this respect they have something in common with social scientists, who according to Earle and Vickery[54] obtain only 30% of their information from periodicals.

Not only are there differences between research and non-research personnel in the frequency of use of periodicals but there are also differences in the type and range of periodicals which the two groups use. Scientists and research engineers tend to consult the scientific and technical journals and to read the literature of subjects other than their own.[58] This dependence on other subjects is often revealed in citation counts and differs significantly from one field to another.[53] Palaeontology and zoology for instance rely a great deal on the literature of other subjects, whereas botany is a relatively self-sufficient discipline.

Technologists, in contrast to their scientific research oriented colleagues, tend to be more insular and to make relatively more use of trade and commercial journals. It has been suggested by Ladendorf[62] that this is because scientific journals are 'usually incomprehensible to the average technologist'.

All the use studies which have been reported reveal what most librarians knew already, namely the heavy dependence by any given group of users on a small proportion of the literature available to them. Thus in the medical field Hardegg[63] found that only 10 journals were used frequently by more than 50% of the teaching staff at Heidelberg University. In the field of astronomy 75% of the demand can be satisfied by only 9 titles,[55] and Strain[64] reported that only 25% of the titles in the IBM Electronics Library were heavily used. At the NLL a similar state of affairs exists. In a survey of the use of medical literature,[44] 3.3% of the titles used were found to account for 21.5% of the loans and in the social sciences,[45] 17 titles accounted for 20.2% of the requests and 116 for 55%. Trueswell[51] refers to this characteristic as the 80/20 rule, i.e. 80% of the demand can be satisfied by 20% of the stock, and points out the fact that the same situation pertains in the field of business and industrial inventory.

Many of the periodical use studies contain lists of the most frequently used titles. These can be of enormous help to librarians engaged in the setting up or weeding of collections. Such lists appear for science and technology,[49] medicine,[44, 50, 52, 59] biomedicine,[46, 56] social science,[45, 54, 65] ecology,[60] and mechanical engineering.[17]

It is noticeable from all these studies that English-speaking scientists and technologists make very little use of foreign language material. For instance, 87% of the requests received at the NLL for biomedical literature were for English language serials,[46] and the figure was even higher (98.4%) in the case of social science.[45] Similarly, Meadows[55] found that 90% of astronomy citations were to English language publications. These figures undoubtedly reflect the inability of at least British scientists to cope to any degree with foreign languages other than French and also their lack of knowledge of translation services.[66]

Not only do users of the literature rely almost exclusively on small numbers of English language periodicals, they also rely, and to some extent this is more understandable, on the recent literature. Clements[42] discovered that in public reference libraries only 10% of the active literature was published before 1950. Wood and Bower[43] found the half-life of biomedical periodicals and also, surprisingly, of social science periodicals, to be 3½ years. This was confirmed for social science by Earle and Vickery.[54] In the United States Jahoda[67] similarly reported that the median active age of literature in the files of university scientists and engineers was less than 5 years. Literature with the slowest decay rate has been found to be that in geology with a half-life of about 12 years, and that with the quickest decay rate to be that in electronics with a half-life of about 18 months.

Use of libraries

Most people have in their minds a picture of a library set up to serve the needs of a particular community, be it local (as in the case of a public, university or industrial library) or national (as in the case of the British Museum, National

Reference Library and National Lending Library). To help their users make the fullest use of the literature which has been so assiduously collected, catalogues are created and maintained at great expense, published bibliographic tools are acquired and space is provided for the reader to consult those books and journals which he either cannot or does not need to take out on loan. Furthermore the library staff are permanently on hand to give help and advice.

The real picture, as painted by user studies, is quite different. Libraries, in practice, serve only a small proportion of the communities which could use them. Clements[42] for instance found that 50% of the users of public reference libraries were students and that over half of the visitors had travelled less than 2 miles. Almost 30% did not even use the literature; all they required was a place to work. An almost identical pattern of public library use was discovered by Bundy in the United States.[18] Similar findings were reported in the case of the British Museum Library.[12] Far from serving the nation the BML appears to cater primarily for readers in the London Postal Area. Similarly in the case of the National Reference Library 50% of the visitors came from within a mile of the Library and only 2% worked outside the South East of England. This tendency to make use of a library only if it is near at hand is further evidence of the link between accessibility and frequency of use of information channels.

When in the library most readers consult an average of 4 documents[61] but rarely use either the published bibliographic tools[42, 43] or the catalogues[36, 43] to locate the literature. Even when searching for information rather than a specific document they seem to prefer to search the shelves, hoping that they will come across a book which meets their requirements. At Birmingham University[43] it was found that even amongst those who failed to find the information sought 65% of the undergraduates and 58% of graduates did not consult the catalogues, abstracting tools or members of the library staff. Even where a reader services librarian is provided, users seem reluctant to ask for help.

In conclusion

Rather than summarize results from the various user studies which might give an unwarranted air of neatness and finality, the following comments arising from these studies are presented for consideration:

1. Ease of use is a more important criterion than potential value when a scientist selects an information source.
2. The undoubted value placed on informal communication suggests that means should be developed (possibly some form of directory of interests, skills or research projects) that would facilitate interpersonal contact.
3. The lack of use of library tools such as abstracts, indexes and card catalogues suggests that library users need instruction in how to search for information. There is evidence that users actually desire such instruction.[17]
4. As guides to the primary literature, titles plus well chosen keywords are just as reliable as abstracts. Where abstracts score is in helping workers to keep up to date without using the primary literature.
5. Mechanized information retrieval systems, at least in their present form, do not

seem likely to supplant the more traditional methods of gathering information.

6. Libraries generally are overfull. Judicious weeding of collections based on the 80/20 rule would provide much needed space without significantly affecting the quality of service.
7. The flow of information could be improved by, at best, providing translation services within the users' own organization, or at least by making users more aware of national translation services.
8. There is evidence that reviews of progress are wanted by scientists and technologists. This is probably the only way they see of keeping up with the ever-expanding literature of their fields.
9. Librarians should sell themselves as well as their services to potential users. Line[68] has shown that in universities the organization of literature courses tends to break down the barrier between students and library staff.

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DISCUSSION

M.B. LINE (Bath University) reported that the senior researcher of the OSTI-supported Investigation into Information Requirements of the Social Sciences, J. M. Brittain, was about to publish a major review of information used with special reference to the social sciences. The report on the main investigation, which used questionnaires, interviews and participant observation, was due to be submitted shortly: its findings reinforced previous studies of scientists, but differed at a variety of points.

A. SANDISON (NRLSI) said that the high proportion of NRLSI readers which came from London and the South East was inevitable. Every reference library had a local role which was superimposed on any regional or national roles. For NRLSI this effect was exaggerated by the large numbers of workers living near London who searched on behalf of others in all parts of the country and of the world. He had found that half-lives measured for literature up to 5 or 10 years old were much shorter than for older literature. This seemed to result from the superimposition on full retrospective searches of the efforts of workers updating their searches made on previous occasions, and, for national libraries, of abstracting and current awareness services. Unless this were allowed for, the importance of older literature might be seriously underestimated; and all half-life figures needed Line's correction for the amount of literature available. Otherwise quite spurious conclusions might be drawn. If every item were used equally often in a collection which had doubled in size in the last fifteen years, use statistics would show an apparent half-life of fifteen years. But this would bear no relation whatever to any greater importance of newer or older literature.

E. R. YESCOMBE (Northern Polytechnic) said that brief reference had been made to students who used their own books or studied notes in academic and other libraries without reference to library stock. Non-college based students, studying law and other subjects by correspondence courses, frequently did this in London libraries, thereby depriving others who wished to consult books etc., of seating and table space at peak period.

R. R. STOKES (Construction Industry Training Board) said that figures, based upon replies to questionnaires distributed to users in industry, which claimed to indicate the user rate of abstracting services, should be treated with caution because the questionnaires had usually been addressed to people who were exceptionally busy and were therefore less likely to complete and return them than those who had more time to spare. The fact that only a small proportion of the questionnaires issued was returned was not necessarily an indication that the abstracts were not used or appreciated. In many cases they were specifically designed as informative material for the busy executive who was unable to spare time to read in greater depth and who wished to be kept aware of current developments in his field. This was the type of person who was unlikely to take time to fill up a questionnaire.

E. R. EASTEAL (Marconi Company Ltd) agreed with Dr Wood's statement that graduates entering industry frequently did not know or use basic sources of information. He believed that the universities were mainly responsible for this, and had led industry to set up education departments for continuing and extending their education by the use of induction courses and graduate projects. The new company entrant was then immediately faced with the need to know and use his company sources of information in order to evolve, design and take up to manufacture the project within a given budget and time-scale.

NATIONAL REPORTS AND INFORMATION POLICY

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THE PLANNING of pure and applied research, with its related questions of scientific information policy, has become an accepted commonplace even in countries where free enterprise is the dominant practice—a sort of general panacea. It is rather paradoxical that some of us who were pleading for this sort of approach in the late thirties may now be just a little disappointed. I would like to remind you that Bernal's *The social function of science*[1] when it appeared in 1939 was considered revolutionary and Utopian by some and plain subversive by others. Some of the invective and abuse at the time, about the dangers of co-ordination and control, were still echoing during the Royal Society's Scientific Information Conference in 1948.

Clearly in so complex a situation there are many factors which brought about this volte face. However, from the point of view of scientific communication and information, perhaps the two most significant causes are the 'mega-involvement' in Governmental finance and the unforeseen implications of the computer in storing, exchanging and re-packaging both documentary information and data, and in dissemination by printing, etc. (The statistics for two typical countries, the USA and Western Germany show the trends. Thus in the USA in the 1950s, while the GNP was increasing at 5% p.a., the federal expenditure on R & D was increasing at 29% p.a. The actual national expenditure on R & D, private and public, is now well over $27 billion a year. Specifically for scientific and technical information the Federal Government is estimated to have spent $ 215 million in 1965. In Germany the Federal Ministry for Scientific Research raised its budget for scientific information by 44% from 1967 (DM 5.6 million) to 1969 (DM 8.1 m) and it will be over DM 10 m in 1970.[2] This sum is all the more significant when it is realized that Germany is highly decentralized with the major responsibility and expenditure for education and science in the jealous hands of the individual Länder.)

Once again the real facts of life—essentially the cash nexus—have completely changed the whole climate of opinion in relation to governmental controls. Thus it is not accidental that one of the most successful of OECD's initiatives has been its 'Scientific and Technical Information Policy Group' (IPG) set up in 1965.[3a] It is constituted by senior officials responsible for national information and library activities in nineteen Member countries, mainly in Western Europe, but including also Japan and North America. At a Ministerial Meeting on Science held early in 1968, a basic resolution was accepted:

'That Member countries should take appropriate steps with their respective governments to establish in each case a single high level focus concerned with all national activity in the field of scientific and technical information.'[3b]

Considering the administrative questions involved, this recommendation has had rapid results. Co-ordination has become the accepted watchword, certainly on paper. In the past two years the creation of an Agency (or Comité or Consiglio or Rad or Centraal Organ) for Scientific and Technical Information, responsible to the Ministry of Education and/or Science in most of the OECD countries, has been reported. Their stated objectives have much in common:

(a) organization of objective studies of user needs and habits;
(b) training of information workers at university level and instruction for scientists and technologists on how to use documentation services;
(c) development of information networks and the utilization of internationally available secondary stores of subject information on magnetic tapes.

Admittedly the creation of such a centralized 'focus' with any real executive power is much more difficult in such countries as the USA, the UK or even France, where information services, generators of secondary publications, etc., are highly developed and well entrenched. For the smaller countries it is much easier to insist on co-ordination as it is more and more becoming a life or death struggle in the vast, almost hostile, world of information transfer. None the less, one might be forgiven for wondering how many of these Agencies will become effective—there is still too much lip service and not enough understanding that scientific information cannot be had on the cheap.

Thus any serious evaluation of information policy and the problems of national co-ordination can be studied most effectively in the efforts of the 'rich' countries, in terms of documentation potential, like the USA and the UK on the one hand, and France and Germany on the other. In addition there are two other 'worlds', the Socialist countries of Eastern Europe, and the 'developing' countries, which all have the same basic priorities (information like peace is indivisible), but have other potentialities and difficulties. In this paper I propose to limit myself to the national policy of the larger OECD countries and the relevant international developments of the late sixties. (This limitation is partly due to the comparative inaccessibility for me of the original documents for a proper understanding of the policies of the countries of the Council for Mutual Economic Assistance[4] sometimes called COMECON.)

USA

The situation in the USA is more complex, more anarchic, more determinative for the rest of the world of documentation, more worked over and analysed, than in any other country. It is also more open-ended in the sense that almost every conceivable solution, from utter *laissez faire* to rigid federal control, has been proposed. Historically the information crisis is a direct result of World War II where for the first time applied science became the dominating factor. But the immediate catalytic spark was what might be called the Sputnik effect at the end of the fifties. This led to a demand for 'the reappraisal of the nation's scientific and technical effort, [and] that a series of major studies of scientific-and-technical-information problems were sponsored by the legislative and executive branches of the federal government.'[5b] The direct and important results were the creation of the Office of Science Information Service of the National Science Foundation (the non-federal, non-commercial sector) and the Committee On Scientific And Technical Information (COSATI) of the Federal Council for Science and Technology (the federal sector). It was at this time that the vogue for investigating panels of Congress, task forces, etc. started, and they began to take evidence on a wide front and publish their findings and recommendations. Thus were provided official published reports giving detailed micro-structure, diagnosis and therapy galore. The Weinberg Report[6] is only one of very many of such reports, although it has made a real impact and caught public imagination far and wide, partly due to the quality of writing of its Chairman, a distinguished scientist-administrator, and its formulation of current progressive thinking. But the recommendations were not really translated into action and the suggested 'Specialized information centers' met considerable opposition. However, in the form of 'Information analysis centers' (there are now at least three hundred such centres in Federal Agencies) they are a major contribution to critical review, compilation and re-packaging of scientific data in depth, inevitably and justifiably at a high cost in scientific manpower.

Fortunately this cornucopia of exploratory reports has been expertly analysed, compared and summarized by a team from the System Development Corporation, under contract with COSATI, and published with the title 'National document-handling systems for science and technology'.[7] From 1958, when the Baker Report (*Improving the availability of scientific and technical information in the US*) appeared, till 1965, there were more than twenty such reports, and they selected fifteen of them for review. (They also include a description of the advantages and disadvantages of the highly centralized Institute, VINITI in the USSR.)

The picture which emerges is a present system (or lack of system) of great complexity running in parallel at times and thoroughly intertwined at others, supported separately by the Congress and the President's Office. The present set-up could be strengthened by the least additional expenditure. 'This concept, however, does not adequately provide for overall fiscal planning, thus perpetuating spending. In the long run, the continuance of overlapping collections and duplicative services, combined with an increasing number of users and science and technology documents, will result in costly inefficiencies and perhaps the highest ultimate cost'.[7] Above all it would be hard to meet one of the fundamental assumptions that seems to have matured over the years, since the first Sputnik was launched, namely that

> 'The federal government has the responsibility to ensure that there exists within the United States at least one accessible copy of each significant publication of the worldwide scientific and technical literature.'

Although almost every phrase of this thesis begs a number of questions, documentalists and librarians all understand instinctively what is meant; after all, the idea behind it has always been part of our unwritten credo. My only addition would be to ask why only S & T—if our society is to be sane, it must be *one* culture rather than two. If one accepts the principle we must ask ourselves very seriously how large must a country or a region be to justify such an aim. Be that as it may, the fact remains that in trying to achieve the above aim Americans have had to begin to accept shared cataloguing, MARC, some international standardization. The older policy of going it alone is gradually breaking down; in a number of subject fields, e.g. atomic energy, chemistry and now agriculture they are making bilateral exchange agreements or operating within international systems like INIS.[8]

As COSATI was beginning to succeed in co-ordinating federal information units, it also became clear that its effect on private (professional and commercial) documentation was naturally much less marked. Therefore the NSF arranged in 1966 for two prestige academies (Sciences and Engineering) to establish a committee, the so-called Committee on *S*cientific *A*nd *T*echnical *COM*munication (SATCOM), to recommend suitable policies for this toughest of all interfaces—Government v The rest. This Committee of twenty-five members was composed of academics and industrialists in a 2:1 ratio and their Report[5a] which appeared in 1969 is in some ways a sort of apotheosis of a decade of reports. The 'philosophy' advocated comes through loud and clear in the following statement which is a finely phrased compromise.

> 'To be pluralistic, user-oriented, rapidly evolving under strong federal support—but with strong self-coordination to match the growing responsibilities of the private organizations—is, in broad outline, the pattern we advocate for the rigorous growth of scientific and technical communication.'

There follow fifty-five specific recommendations, arranged under five general areas:

1. Planning, co-ordination and leadership.
2. Services for users (consolidation and re-processing).
3. Classical services (libraries, communication by publication, secondary services, conferences).
4. Personal informal communication.
5. Research.

The first recommendation is for the establishment of an analogous body to COSATI in the form of a permanent Joint Commission on Scientific and Technical Communication, responsible to the Councils of the two Academies. This would speak for the scientific, technical and commercial communities on the problems of information transfer and act as a go-between with the federal authorities. But as in all matters of planning and government the brutal reality is that committees are as effective as the power and the sanctions they command.

The recommendations are almost all unexceptionable and reiterate in fresh and stimulating language the best thinking of the past, without any real new recipes for implementation. On such a crucial question as copyright, where most scientists and information workers adopt far too light-headed an attitude, they have been rather too reticent. Their concept of shared responsibility between the private sector (both profit and non-profit) and federal agencies is too optimistic. In the struggle between competing periodicals and overlapping abstracting services, commerce tends to cream off the more lucrative trade—the market place is inevitably anarchic. Actually they point out that 'the usual test of the market place [is] an insufficient guide to the need for and value of information services'. However, there is no doubt that the recommendations will provide a valuable touchstone against which American progress can be measured.

France

For some thirty years France has had a highly centralized approach to libraries and documentation work. Like the Soviet VINITI, though very much earlier, it concentrated on one service (the Centre de Documentation of the CNRS) to provide abstracts (*Bulletin Signalétique*) over the whole range of science, technology, the social sciences and related fields. From the beginning of 1970 they started a fascicule 'Informatique scientifique et technique', computer-stored and printed-out. None the less it has been clear for some years that even apart from the growing stresses of trying to maintain complete and rapid coverage, the Centre was not fully meeting the needs of industry and even research workers, and was being by-passed in consequence.

Thus by Decree[9] of the 9th December 1968, the Prime Minister created a Comité National de la Documentation Scientifique et Technique (CNDST) under the Délégation Générale à la Recherche Scientifique et Technique, to work out a national information policy including:

(a) the co-ordination of different documentation centres to facilitate, exchange and stimulate new initiatives where there are gaps;
(b) the outlining of rules for standardization and compatible methods;
(c) advice to the Foreign Office on international co-operation in documentation.

While the terms of reference do not cover the humanities, they do include relevant aspects of law and the social sciences. The composition of the CNDST is rather significant. There are six representatives from industry, two specialists in biomedicine, and nine titular members including the Director of Libraries, the Director of the CNRS Centre de Documentation, the directors of documentation of the Atomic Energy Commission (CEA) and the Armed Forces.

While it is still too early to have any tangible results, the Comité has set up working groups and some trends are becoming evident. Thus they are thinking in terms of three Levels. Level I would be the primary identification and notification of all significant papers, etc. (macro-units) with some broad subject categorization. Rapidity and exhaustivity are essential and this implies the use of computer techniques, partly to benefit from what is internationally available on tapes.

Level II, consisting of the ensemble of specialized information centres, both public and private, would select from Level I what is relevant to each subject field and produce abstracts and data banks in depth giving that subject expertise which is essential for scientific documentation.

Level III is concerned with arrangements for users, so as to provide both SDI and retrospective searching and related services of copying and translation, by utilizing to the full the capacity of the centres of Level II.

For such a 'réseau documentaire' to function satisfactorily there must exist a highly responsive organization for rapid access to all cited documents (papers, reports, books, etc.) and this does not exist on an adequate scale. Probably France will have to come round to creating an NLL, perhaps at Aix-les-Bains or Vichy!

Western Germany

In the early fifties the state of documentation was poor and there was the inherent difficulty that this activity by the nature of the Constitution belonged to the Länder, which opposed any centralized federal planning. The situation was saved by the creation in 1959 of the Institut für Dokumentationswesen,[10] which somewhat paradoxically has placed Western Germany in the European forefront in planning and carrying through pioneering projects like the computerization of the national bibliography.[11] Thus at the time of the already mentioned OECD Ministerial Meeting in 1968 the climate of opinion was such that the Ministry of Scientific Research[2] not only accepted the OECD recommendations, but was ready to spend comparatively large sums of money to foster national information services in the main scientific and technical disciplines. In effect they seem to have overcome the potential barrier where narrow local interests could inhibit effective action.

It is thus symptomatic that their plans for the seventies involve moving forward from the well understood traditional documentation of science and technology to a large investment in computerized data banks and in a control of the literature of the social sciences, where the information gap is indeed serious.[12] For the latter they hope to support social research, legal practice and political decision-making by handling data (rather than documents) in social statistics, environmental studies, town and country planning, etc.

United Kingdom

Overall planning and co-ordination is something very foreign to the English scene, although there are old traditions in certain fields, for example public libraries, where our organization has been a model to the rest of the world. It is partly our riches, treasured in old libraries (both Collegiate and in professional institutions), in national monuments like the BM, that inevitably produce vested interests that in principle are not likely to fall for any OECD exhortations or Whitehall plans for rationalization. Nevertheless in the world of books and documents there is a nemesis which we cannot escape, even in these islands—space, staff and money. As you all know, it was just such an impasse which finally led to the hurried appointment of the National Libraries Committee which reported with such exemplary speed on the 10th June 1969.

More than a year has now passed since that Report[13] appeared—we are becoming impatient, but we are still hopeful. There has been some criticism of details[14] but the consensus is that the Dainton Report is a good one. Its basic recommendation is particularly relevant in this context of planning information services. A statutory and independent public body, the 'National Libraries Authority' should be established to *co-ordinate the services and operation* of the principal national libraries and services (BML, NRLSI, NLLST, NCL and

BNB). This could be revolutionary and bring us almost into the twenty-first century. Above all it could provide that essential basis on which the success of any national information policy depends—the substratum of good libraries and efficient services, the lack of which makes all the fine talk about man-machine communication, interactive networks, free text searching, etc., so much shallow propaganda. To be quite frank, it is this which is missing in so many developing countries and even industrially advanced countries, and the best laid plans (Technical Assistance) of Unesco and OECD are as nothing in the face of such bibliothecal poverty. We have long had the means and we now have a blueprint to make them effective.

Perhaps there are a few doubts that I would like to express, but they are matters which the Authority should be able to take in its stride. As we have seen above, the USA in its pioneering optimism has in effect said, the sky is the limit—'. . . one accessible copy of each significant publication . . .'. The Report nowhere really faces up to the question: what are we aiming at? A 90% service in terms of full world coverage or must we be satisfied with a 75% level? What is the cost for any specified level and how much are we prepared to pay? In one important aspect the Report sets its sights too low—the provision and availability of the literature of the social sciences and the humanities. Admittedly the cash return is more obvious in science and technology, but that is taking too narrow a view of the indivisibility of information. We know that we cannot muddle through in chemistry and electronics, but what guarantee have we that human ecology is so much less dependent on good documentation?

International developments

Even though my subject is national information policy, international developments are very relevant as they are already raising hopes and producing irreversible results. I shall discuss two projects, the one more narrowly organizational, the other broad and finally encompassing all science and technology.

(a) *The Jackson Report.* This Report,[15] which concerns itself with the capacity of the whole UN family to carry through the United Nations Development Co-operation Cycle, addresses itself (Chapter 6) for the first time officially to the almost scandalous gap between this expensively produced information and its public utilization. Thus 'It is estimated that by the end of 1970 about 100,000 document references (i.e. documents that have been abstracted and stored in the computer systems) will be stored in the FAO, ILO and UN documentation centres', and the rate of growth is around 20,000 per annum. This is only the tip of the iceberg as in FAO only about 10% of the relevant documents are published. For various reasons, project results, representing surveys and data of unique economic, social and technological value, only become slowly available, if at all. This is of course much more serious than the much publicized duplication of research due to poor dissemination and retrieval.

The proposed plan, which would include all the Specialized Agencies involved in the UN Development Program (Technical Assistance), would set up a Coordinating Centre in New York or Geneva to which all reports are sent immediately for cataloguing—only once and not in as many as ten offices as at present. Uniquely identified with an international number, they would then be distributed to the relevant Specialized Agencies for depth indexing and abstracting; food to FAO, education to Unesco, weather conditions to WMO and so on. Furthermore it would be the duty of the Agencies to pass on the documents, if suitable, to the subject abstracting services all over the world. The cataloguing, indexing and microcopies of each document would be sent to the National Documentation Centres in the developing countries, where the original work was done. Copies, probably in microform, would be available to all bona fide users from the Co-ordinating Centre or the Specialized Agency, whose expert staff would do retrospective searching in answering inquiries. Thus a vast amount of information, at present lost to all intents and purposes, for which we have all paid in the form of aid, will become available and part of the bibliographical record. The implementation of this Report is likely to go forward once the Agencies have their operational computer systems and the necessary additional staffs. ILO, FAO and UN are now in full swing and Unesco and WHO have already acquired their computers.

(b) UNISIST. Since I have described this joint ICSU–Unesco project for a world science information system elsewhere[16] I shall only bring the story up to date briefly. Unesco is working on the editorial and publication plans of the Final Report and its synopsis and they should be available in good time before the proposed Intergovernmental Conference on UNISIST to be held in Unesco House in October 1971. The Report is not only a well-written synthesis of what has emerged from three years of expert and active work by the Central Committee and *ad hoc* working groups, but also one of those landmarks in a subject which focuses the issues and the potentialities at a point in time—the last quarter of the twentieth century. At the 5th Session of the Central Committee early in October a study of an 'International Serials Data System' prepared by members of INSPEC will be discussed, and this in some ways represents one of the most potentially important advances in bringing some order into the bibliographical control of publication in scientific periodicals. The proposed System has three components:

(a) machinery for the assignment and maintenance of an International Standard Serial Number (ISSN) analogous to the ISBN for books;
(b) the maintenance of a serials data base;
(c) an international network for the collection and dissemination of serials data and the promotion of bibliographic standards, like title-word abbreviations and the citation of articles in serials.

In conclusion I would like to leave with you the following liberal thought (which I came across recently) as a guide to practice. In human affairs one should aim at as much decentralization as is feasible, and as little centralization as is necessary for efficiency.

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WHERE DO WE GO FROM HERE?

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THE REMIT for this, the last session of the Conference, was to consider the papers on specific issues given by the other speakers, to comment thereon, and to try to take a look into the future on the basis of what has been said. The views presented here are those of a librarian/information officer concerned almost solely with practical, day-to-day work and not directly with research activity. They therefore represent an overview as seen by one who is the recipient of the output of research workers and who must consider the applicability of research findings to systems and procedures at the point of use.

The literature of information handling has produced little by way of positive formulations of policies for the direction of research, and those items which have stirred imaginations, such as Licklider's book of 1965,[1] have been so broadly based as to provide only tantalizing pictures of the assumed super-systems of the future, without convincingly defining the bases on which the several parts which might make up the whole can be properly researched and developed. Mr Farradane made the point that it is not sensible to research on the field as a whole, and he is probably right about that, for so many of the predictions for the future have comprised no more than these very generalized pictures, with inadequate attention to the problems which beset us in the many specific areas.

Tackling the individual parts of the whole does, however, tend to lead to fragmentation, which is acceptable provided we keep in mind the ultimate goal, but what seems to be happening is that researchers are now shooting off in all directions, sometimes along highly specific avenues, and one has the impression that in many cases investigations are either abortive or reach conclusions whose applicability is uncertain. Without well-defined lines of development, this seems to result in the abandonment of one investigation for another, with a consequent uncontrolled chain reaction which is producing no once-and-for-all settlements of issues which must be mastered before integration into satisfactory whole systems can be achieved.

It is not surprising that the speakers have not been too sanguine about the future and some, including Mr Whiteman, have expressed the view that reaching useful conclusions is difficult. In the light of the dearth of useful material in the literature and the problems which have been highlighted by the speakers, one approaches the task of trying to extrapolate our ideas into the future with no little trepidation. It does seem possible, however, to isolate particular areas and examine them with a view to determining what we know, what conclusions we can draw from that knowledge, and what problems we should perhaps regard as crucial to future progress. Consideration of the papers individually would result in fragmentary treatment of specific subjects and an attempt is therefore made below to deal with the subjects which seem to be significant within a rational framework, introducing observations made by speakers and contributors to discussions as appropriate.

We ought, perhaps, to ask ourselves first whether history has anything to teach us, in order to judge whether trends and achievements point to our having to accept limitations in certain areas, or suggest where research and development might be profitable. Mr Whiteman suggested that it is too early to recognize an established historical picture, which is undoubtedly true in general. As far as information retrieval is concerned, however, it does seem that the position with regard to conventional methods has crystallized and we ought to be able to judge what is and what is not possible in this area. Unfortunately, we seem to have reached a point at which there is little promise of any dramatic developments in the foreseeable future. Conventional cataloguing and indexing, however sophisticated they might be from the points of view of both bibliographical description and accurate subject prescription, have always been bedevilled, and always will be, by the problem of 'distributed relatives', a problem which mechanized systems using post-co-ordination, however simple, have successfully overcome. For those of us limited to using conventional methods, it seems that the best we can hope for is tools of the quality to which we are accustomed, with some promise of improved economics because of the availability of cataloguing and indexing data from commercial sources, or its generation on a co-operative basis. We have probably reached a peak in terms of quality and should look for advantages from the cost side of cost/effectiveness, advantages which accrue from the application of mechanization to conventional principles, for the only real milestones as far as principles are concerned have been the appearance of Cutter's rules in 1876 and Coates's excellent work in more recent times.[2]

Classification has, of course, been the basis on which many conventional systems have been built. Its history, as far as its application for bibliographical purposes is concerned, began with some rather confused carrying over of the principles long embodied in traditional logic. How people managed to write textbooks in those early days, and how students managed to assimilate their contents is something of a puzzle in retrospect. The advent of the principles of facet analysis seemed to promise to rescue us from the difficulties of those earlier times and they have undoubtedly provided a more rigorous and more generally satisfactory method of handling concepts. Classification used conventionally, that is for arranging things in a recognizable order for the purpose of reference to a particular point in a file, suffers, however, from precisely the same problems as does any non-classified conventional system, and however clever the basic analysis and however flexible the system for handling multi-topical subjects, precise subject specification does not necessarily mean that location of a required subject is any better provided for. It seems to be a very great pity that we do not get classification and its applicability to our problems in proper perspective, because even with systems, conventional or non-conventional, which do not explicitly use classification, a proper understanding of it is a great help in *thinking about* the problems which arise. We have limited our view of classification too much to its application to *arrangement* for it pervades all our activities, including class *making* in all synthetic systems.

We ought by now to be facing the fact that, though a complex subject can be regarded as belonging to that specific class formed by the conjunct of several simple classes, it properly belongs also to each of those simple classes. Hence a searcher should be able to call for a subject by specifying that the subject falls into any one or more of those classes. We have known for a long time that it is impossible, for simple mathematical reasons, to provide a linear order of documents or entries for them, which will meet this need. It is time therefore that we abandoned attempts at sophisticating classifications still further with a view to having better arrangements, for it is impossible to achieve anything much better than we have already. We shall have to accept that comparatively crude arrangements (which are far better than no arrangement at all) are the best we can have, and that only post-co-ordinate systems will meet the needs of complex subjects. I wonder whether we shall ever see anything better for the physical arrangements of documents than UDC.

This is not entirely conjecture. ICI Fibres has, in the last two years, adopted a new filing scheme for Research Department correspondence and its basis is a faceted classification scheme. The classification schedules provide for synthesis of required classes to any degree of specificity and a notation is used in the accepted sense for designating the classes. However, it had been accepted from the outset that when a scientist calls for the file on a particular subject he is not interested in what files live next door to that one, and it was decided that all the class numbers would be converted to simple running numbers. Thus there exists a series of files numbered from 1 to about 350 and administration of the files by clerical labour is beautifully simple. The purpose of using the classification is, of course, to control the making of classes, to avoid duplication and ambiguity, etc. and there is therefore a second set of schedules, known as the 'Working Schedules', which list the approved classes in the order we think is the best possible. These schedules follow the notation order only approximately. The one trouble with the whole scheme is that users claim that the Working Schedules do not show any 'pattern'. This caused considerable concern, though it was known that the difficulty arose from the factors mentioned above, and one is convinced that no matter what efforts are made it will never be possible to please everybody. It was comforting to discover that Mrs Jean Aitchison in her *Thesaurofacet* had stated that '. . . "preferred order" reduces the efficiency of facet schedules and is not recommended for use with the *Thesaurofacet,* particularly in systems likely to have a high concentration of documents in a limited subject area'.[3] Rearrangements in the form of permutations are left to the discretion of the indexer. Both these pieces of evidence add weight to the contention that it is purposeless to try to do what is already known to be theoretically impossible, for we cannot have a universally acceptable 'pattern' for a subject field, be it large or small.

Mr Cleverdon has given us an excellent account of the development of nonconventional systems. He showed how the battle had raged over particular issues and what confusion there had been in some areas, but in the limited time he had he did not mention certain curious features which seem to be significant. The very early days saw some funny ideas about what was being attempted and the bases on which these attempts were founded. We are not very conscious today, for instance, that the early workers were concerned not only with concept co-ordination as we know it, but with correlation of information to generate new information. Wright, for instance, said in 1952: 'Through a proper organization of the various categories the researcher could discover not only what was available on a specific subject but also new combinations and comparisons of facts where relationships have never been previously recognized.'[4] Perry, at the same time said: 'The ability to direct searchers to new combinations not visualized at the time the documents were analysed is one of the principal advantages of machine searching methods,[5] and Garfield, a little later, stated: 'These techniques may also be employed to establish correlations between previously unrelated data.'[6] Actually this was no new idea because Charles Dickens had thought about it much earlier. Hillman, in an article just ten years after Garfield's, quoted a conversation between Pott and Mr Pickwick, the subject of which was a series of articles reviewing a work on Chinese metaphysics.[7] Pott reported that the critic had crammed for the purpose by reading up the subject in the *Encyclopaedia Britannica* and when Pickwick commented that he was not aware that *Britannica* contained anything on Chinese metaphysics, Pott said: 'He read, sir, he read for metaphysics under the letter M, and for China under the letter C, and combined his information, sir'.

Nothing seemed to come of this idea of correlation, and as early as 1950 Ralph Shaw had warned about 'fuzzy thinking about the creation of new knowledge by assembling unrelated data mechanically'.[8] We do have a situation now, however, where there is the likelihood of correlation techniques being used, particularly in fields such as that concerned with the relationship between chemical structure and biological activity. Whether the application of such techniques is the business of information specialists or the scientists themselves is somewhat doubtful, but the prospect does seem to be that the dividing line between the work of the scientist and the information worker will become very blurred.

Even in the field of co-ordinate indexing as we know it, there seems to have been some confusion, for Taube apparently based his ideas in the first place on x and y co-ordinates as used in mathematics,[9] only to state later that the logic of co-ordinate indexing is 'the class calculus of modern symbolic logic, which in turn is based upon Boole's algebra of logic and Schröder's development of the algebra to its present definitive form'.[10]

The pattern of development of non-conventional systems seems to have been a series of long plateaux with occasional leaps forward, but the recognizable advances have been confined to the *mechanics* of handling information in retrieval systems, and these are trivial compared with the problems of formatting the information before the representations of concepts are so handled. We have, of course, had significant developments of special kinds such as the citation index, and the introduction of certain devices which help with syntax, etc., such as links, roles and weighting, for use in post-co-ordinate systems, but we are still faced with the seemingly intractable problem of proper representation of 'subjects' to provide for their retrieval from the many different points of view with which different enquirers may be concerned.

There has been an assumption, which Mr Cleverdon has called into question, but which Mr Farradane supports, that indexing languages must be subject to rigorous control. This assumption has existed for a very long time now, but more recently we have seen attempts at handling texts of one kind and another on a 'free' basis, that is without conversion to some standard language at both input and searching. This question of whether we shall in the future be using controlled or free languages in retrieval systems is, it seems, one of the fundamental issues. We seem at present to have little evidence of the superiority of one method over the other and in neither case is there a well-established basis on which languages or processing can be founded. In the case of controlled languages, the thesaurus is the 'in' thing at the moment and it is evident from the nature of the rules which have been developed to date to help us construct such tools, that we really know very little about the business, because such rules only scratch the surface. The research done at Cranfield pointed to the probability that simple terms are more effective than compound ones and the practical experience of some of us seems to support this, but there are real difficulties, and it is interesting to note that Mrs Aitchison, in the *Thesaurofacet*, has introduced compound terms deliberately, for reasons which she clearly explains.[3] Mrs Aitchison's sound philosophy here only points up the difficulty we are in in trying to decide whether to use compound or simple terms and it brings to the surface the question of what qualities the ideal indexing language should have. Moss suggested some years ago that the answer was to use what Bertrand Russell called 'minimum vocabularies', such vocabularies being those in which no one term is definable by the other terms.[11, 12, 13] Now this, like the attempts at mastering automatic syntactic analysis in full-text processing, satisfies a condition which may be necessary, but not sufficient, to meet our needs, for if we are aiming at controlled languages the basic requirement is that there shall be only one way in which a subject can be stated, for only by achieving this can we be certain of matching search prescription with indexing data. Minimum vocabularies may be all right for transmission and reception of messages, with perfect assimilation by the receiver, and automatic syntactic analysis may be satisfactory for conversion of parts of speech in one language to their equivalents in another, but neither meets the necessary condition of uniqueness. If we hope to achieve high recall with high precision, this problem will have to be faced, and it is indeed a formidable one.

Professor Goffman's purpose was to examine the nature of information science and he expressed concern about the possibility of its disappearing from the scientific scene Part of his hypothesis was that such a science should be based on the communication problem, i.e. the sequence of events involved in the transmission of information from a source to a receiver. But this limits the objective to the *necessary* condition outlined above, and still leaves the *sufficiency* unsatisfied as far as indexing languages are concerned. Communication of information reliably is, of course, of first importance, whether it be the inputting of the information to a machine, asking the right question of a system, or transmitting information once identified, and Mr Farradane stressed the importance of avoiding distortion. Mr Cawkell, in discussion, mentioned information theory, which is concerned with transmission problems, and wondered whether another look should not be taken at the relationship between this and the question of meaning, because of the appearance recently of conflicting views on this issue. There may well be something in this, but we must remember that the solution of the problems of accurate transmission does not necessarily mean the solution of the retrieval language problem, for a message may be sent and understood using a variety of acceptable semantic units and styles, but matching for retrieval depends upon uniqueness or, otherwise, on a saturation searching technique in which all possible ways of stating a subject are used as search prescriptions.

As evidence of the dangers inherent in languages which do not provide for uniqueness, one can quote Mrs Aitchison's reasons for choosing to use compound terms in the *Thesaurofacet*, i.e. that simple terms are known to provide for a multiplicity of ways of expressing a single subject, and Vickery's observation about authors' and indexers' understanding when he says of the latter: 'their understanding being shown, perhaps, by their ability to formulate the text's subject in words that differ from those used by the author'.[14] We really must get this distinction between what is required for communication of identified information and for finding that information in the first place quite clear, for definition of our objectives of future research on retrieval languages depends upon it.

This is by no means the end of the story, for it assumes that everyone thinks of a subject from a single point of view. Fairthorne, in the current issue of the *Annual Review of Information Science and Technology*, states that 'content' has two aspects:

(a) what a record mentions;
(b) the circumstances of its expected use.

The second aspect is divided into three parts and the third circumstance is that 'with respect to a requirement as expressed by the reader'.[15]

This latter is clearly the most important aspect because meeting a reader's requirement is the object of all our activity, but seldom does the content of a document match this exactly. Moreover, though the document is of interest to him, its indexing will not necessarily be the best from the point of view of matching his stated need because the author's purpose can be different from his own. This is a real, practical problem which those of us who work with retrieval systems meet all too often and when we have an inquest to determine why a system did not retrieve a relevant document which has come to light some other way, we often find that neither author nor indexer was conscious of the particular aspect which now forms the enquirer's interest. This is explainable in terms of traditional logic in that there are said to be three kinds of intension: conventional, which is the accepted definition of a subject; subjective, which is a description of a subject as seen by author and/or indexer; and objective, which covers every attribute which a subject has. It is simply because we do not use, and cannot use, objective intension in our indexing that we have this sort of failure. The particular relevance here is that we have considered information handling on a very broad front and we all tend to think for the future of large, integrated systems which will be all things to all men It is important to be conscious of the fact that it is not only the problem of being specific enough in indexing complex subjects which causes difficulty in this context, but there is the problem of ensuring that a document written for a given purpose is not lost when it is potentially useful for a different one, or at least when it is sought by a label to which it is entitled but which the indexer, quite reasonably, did not attach to it. This problem arises within a subject field of well-defined limits and its magnitude is likely to increase with increasing subject area. It is precisely because we index subjectively and not objectively that this problem is likely to be with us for ever and that we shall never reach 100% recall in terms of what the enquirer considers to be relevant documents, though we might, of course, reach better recall figures in an experimental environment based on the judgment of researchers who consider both document and question subjectively. This in itself should be a measure of real improvement because it is bound to have a beneficial effect on performance in operating systems.

The free language approach tends to assume that as an alternative to reducing everything to a common, standard language, the facility can be provided for searching a great many alternatives in order to catch everything in the net by taking every possibility into account. We are considering here, of course, text searching for the purpose of identifying relevant documents, but there is the alternative of processing the text for extracting indexing terms or phrases to provide a data base for subsequent interrogation, i.e. automatic indexing. Luhn, of course, was the pioneer in this, though he did have in mind a thesaurus as an intermediary. Unfortunately the brilliant conception of circumventing the semantic and syntactic problems by using statistical criteria proved to be abortive and the work done since on non-statistical principles does not seem to be getting very far either. The difficulty here seems to be the establishment of a theory which will give us hypotheses for testing, for so much of what is done seems to be hopeful guesswork in the form of one new formula after another, each reaching an encouraging level of performance but never really getting there. In the absence of reliable theory for this, the heart of the matter, it seems that we can do no more than continue to try this and that in the hope that someone, somewhere, someday will light on an answer. This may not be a forlorn hope, for some unlikely approaches have sometimes produced surprising results. The effect of weighting of terms in comparatively straightforward processes, for instance, has shown impressive results and the work of Dr Matthews bears this out.[16]

Fairthorne claims that 'informational' activity cannot deal with knowledge as such, but only with knowledge of discourse, and not of what the discourse is about. One might question this because it seems merely to confuse media with the knowledge which the media convey, and it would seem to deny, for instance, that knowledge is communicable by the medium of verbal discourse. If Fairthorne is right, then we are in real difficulty because it is what articles, etc. are 'about', and not the nature of the discourse itself, that is the cornerstone of the retrieval of information which is novel to an enquirer.

In this connection it is interesting to consider the assumption which is widespread, that abstracts form a satisfactory data base for processing in retrieval systems, either for searching on or for the extraction of terms to serve as indexing heads. Dr Dutton mentioned the nature of abstracts in discussion and we should remember that abstracts comprise 'discourse'. Extracting 'aboutness' from abstracts by machine is no easy matter and it is not necessarily equivalent to merely selecting terms from abstracts. The danger inherent in this assumption is pointed up by the findings of Hyslop who in 1961 reported that abstracts sent to current awareness subscribers did not contain as much information for their purpose as did the indexing terms used.[17] Perhaps we should look into the question of *kinds* of abstracts and their effectiveness, for it could well be that abstracts which are written specifically to be index-orientated are more effective for retrieval purposes than the informative variety normally produced. Mr Cleverdon suggested that indexing data is generated to achieve compression of a document to reduce the amount of material to be searched, which is undoubtedly true, but the compression should be of the subject of the document and not of the message, or discourse, about that subject.

In the absence of any well-established theory of text-processing it seems that we can only pursue the problem empirically and assess the effectiveness of such processing by judging how well systems work in practice. There is certainly some room here for tidying up the terminology so that we know what we mean by 'free text searching', 'natural language', etc. Mr Cleverdon has suggested in a private communication that 'full text searching' should mean just that, i.e. searching on a complete text, not an abstract of it, etc. 'Free text searching' he suggests should mean searching on the text of a document as presented by the author, and thus covering titles, abstracts, or full text. 'Natural language' Mr Cleverdon considers should be restricted to use in connection with the index language and should refer to indexing terms selected intellectually by an indexer, but comprising terms used by the author, without necessarily being concerned with free text searching. Some would not necessarily agree with these proposed definitions, but they provide a basis for discussion with a view to reaching generally accepted connotations. We might also try to make up our minds what our objectives are in processing text. Are they to pick out indexing terms to convert them to controlled terms as with the thesaurus, or to recognize relevant material when encountered at the time of search, to do either of these by statistical methods, by identifying statements which predicate one thing of another, by identifying parts of speech, or by the recognition of substantive terms, or what? Again, it seems impossible to reach any safe conclusion at this stage because the whole situation is still much too fluid.

What has been discussed so far is concerned only with the specific issues of information handling for storage and subsequent retrieval. Our views on these matters may change in the future and indeed the intractability of some problems may force such a change. Professor J. D. Bernal in 1960 made an interesting statement when he said: 'I anticipate the building up of an information service in the future on a logical basis as a piece of communications engineering. . . . The functions of the information officer and the specialized libraries will be transformed in the process. The storage system will become relatively subsidiary and the communication system will become dominant.'[18] Now it may well be that Bernal's prediction will be proved to be correct. There is no doubt that there are enormous difficulties in providing all-purpose, large-scale retrieval systems which will be all things to all men. Moreover, Mr Fairthorne has said 'The second unattainable target is for the librarian or system to substitute for the individual reader in the selection of documents. Could he do so, he would have to be the reader himself. . . .'[15] and Mr Farradane mentioned the difficulty a user himself has in assessing his needs. This seems to point to the probability that systems designed for limited fields, to be handled by searchers themselves, is the right answer.

Mr East mentioned that on-line systems overcome certain problems, including the need for intermediaries, the rigidity of a system, long intervals for response, and lack of user confidence. The possibility of the use of consoles for direct man–machine communication has always been attractive, and still is, and the observations quoted above add weight to the desirability of our being able to establish such systems successfully. Mr East also mentioned the difficulties of managing such on-line systems because of the problems of handling free text and striking the optimum level of language control. The prospects of success in this area do seem to be remote but the science fiction writer Frederik Pohl, in a fascinating paper in *American Documentation*, struck a note of cautious optimism.[19] He suggested that efficiency is not the be-all and end-all of information retrieval systems (which would let us out of all these knotty problems of language control) and that we ought, perhaps, to model our information searching processes on the activities of the woodlouse. This small creature seems to live a purposeless and sluggish sort of life, but occasionally it is motivated to quicken its pace because there is a change in the dank, dark environment in which it lives, and it then moves in a patternless, random manner until it lights accidentally on a place which again meets its environmental needs. Pohl suggests that searching for information often follows this pattern and that if an adequate prescription of recognition factors is used in a random scan of data which is stored with very little organization, successful searching might well be possible. The trouble with suggestions of this sort is that it is easy to talk about them, but a very different matter to know how to go about setting up such systems. Pohl stated: 'Science fiction has, in fact, more or less accurately predicted nearly every interesting advance in science or technology for the past generation or so, perhaps not always before the men doing the actual research had paved the way, but invariably before the lay public—and many scientific people, too—had any belief that television, manned satellites, atomic energy and the like could ever become real'. But does not a space-man today look so like those of science fiction precisely because some, at least, of the physics involved was understood when the stories were written? And have we any such basis on which we can make such predictions as far as the handling of language is concerned? Mr Farradane mentioned that Professor A. D. Booth has given up attempts at mechanical translation and the position in that field is anything but encouraging.

If such 'super' systems are not to materialize, it may well be profitable to exploit other means of providing required information, with specialist sources using more limited systems to retrieve the information before its transfer. Dr Wood has reviewed the work done on user studies and in this connection those concerned with information flow are relevant here, for they show that the direct transfer of information between people is an extremely important part of the process as a whole. Our deliberate fostering of this method of providing information to the enquirer may well turn out to be the 'communications system' which Bernal had in mind. Those of us who had the privilege of listening to Professor Tom Allen at an earlier Aslib conference will remember the graphic description which he gave us of the activities of 'technological gatekeepers' within organizations, who provide channels for such information transfer.[20] Jackson mentions these informal information networks[21] and quotes the work of Rees, who also recognizes the existence of such transferers of information,[22] and that of Rosenbloom and Wolek[23] along similar lines. These 'Typhoid Maxes' are seen as 'infecting' their colleagues with information which they gather from outside and Professor Goffman also mentioned this 'disease' idea in his paper. This kind of activity is, of course, spontaneous but we might reap substantial dividends if we shifted the emphasis from attempts at building gargantuan automated systems to creating organized networks of specialist sources.

When we talk about 'referral' centres, it never seems to be quite clear whether we mean places to which we refer, or units which refer the enquirer to the right source. If the former, then the idea is not very attractive if they are too ambitious, but if the latter, and they do the job properly, then this is a different matter. It may well be that we all try to be too clever by trying to be self-sufficient, and it sometimes strikes one forcibly what a dramatic saving of effort there is when, by force of circumstance, one uses an outside specialist source instead of trying to meet an enquiry internally. Perhaps we should be indexing 'skills' rather than documents.

Those studies which relate to actual literature usage, which Dr Wood and Mr Line have discussed, are also very valuable. When one considers the store set by people in the distributive trades these days, by the problem of stock control, one winces at the thought of the vast quantities of redundant material we hold in our libraries. The situation is, admittedly, not exactly analogous, but we do acquire and we do store, at great expense, a tremendous number of sheets of paper and items on other media, without much idea of what is really important. Mr East commented, in another context, that all we want is everything, and Mr Vickery said that librarians know the value of everything and the cost of nothing. These observations are as relevant to this area as to any. The establishment of the National Lending Library is the best thing that happened for special libraries in a very long time and those of us who recognize its value have been considerably influenced in our policy regarding stocks. If these studies will further still greater economies in acquisition and storage, then they ought to go on, for we should aim at comparatively smaller, more dynamic individual libraries, not bigger ones. If techniques such as facsimile transmission will add yet another dimension, so much the better.

Reference had been made several times, and principally by Professor Goffman, to the structure of knowledge and the processes through which science develops. Mr Farradane mentioned the psychological aspects of knowledge and Mr Fairthorne commented on the many different interpretations of what is meant by 'information'. Clearly, an understanding of what we are handling is of the first importance and the developmental aspects of science are as applicable to our own field as to any other. Mr Farradane implied that scientific development is a step-by-step process, but Kochen considers that science starts from problems or puzzles, not observations,[24] and he quotes Popper as stating that the growth is not a sequence of better and better deductive systems, but a progression from problems to problems of ever increasing depth.[25] Kochen also quotes Kuhn who considers that the solution of problems requires the reconstruction of prior theory and the re-evaluation of prior data. 'This', he says, 'is an intrinsically revolutionary process that is seldom completed by a single man and never overnight.'[26] Kochen discusses the question of stability in the growth of knowledge and talks of the effects of the arrival of newcomers in a field and the demise of 'old-timers', of reaction and revolution, and provides evidence of a basis on which the stability point can be predicted. Indeed, he quotes Professor Goffman whose work concluded that in the field of mast cells this point would be reached in 1978.

If science develops in this way, and if the transmission of information is through the kinds of channel discussed earlier, where does the information scientist fit into the picture? Are the data which are processed already available to the scientist carrying out the processing and does the information scientist only come into the picture to fill in the odd gaps by using his retrieval techniques, etc? If so, his seems to be but a minor role which can at best save doing certain pieces of work over again. Should he try to assume a more significant function in the process, and if so how do we go about fitting him to do it? Unless he is one of the scientists, with as full a knowledge, and with equal scientific competence, as the research team itself, it does not seem likely that his contribution can be all that it might be.

Kochen talks about 'research on research' and wonders whether this will 'coalesce into the theoretical nucleus of information science'. This diffusing of information science through so many different disciplines, e.g. the learning process, communication, and the scientific disciplines themselves, blurs the edges of the subject more and more. The nearer we get to a situation in which the information scientist is an indispensible part of the research team, the more he seems to be a scientist of that discipline and the less he can be considered to be an information scientist. In this context, is any scientist not an 'information scientist'? There is hardly a parallel case to the position in which the information scientist finds himself. In considering supporting services for research, an obviously important one is that of statistics. The statistician applies his specialized techniques to scientific matters, but he hardly needs to get deeply involved in the subject matter in order to make his contribution. The information scientists can hardly stand off that far and the future is likely to see him more and more deeply involved because of the impossibility of distinguishing between science and information science.

All this relates to where information science fits into science itself. But if information science is, or can be, a science in its own right, how do we pursue a positive line of development? What has been said at this conference has shown that certain areas are recognized as deserving research, and as Mr Cleverdon claimed, we have learned some useful things from what has been done already. There seems, however, to be an uncomfortable feeling about the future lines of research into the field as a whole. The view that there is no established basis from which the problem can be tackled as a co-ordinated, integrated whole is supported by the work of Cuadra, whose paper 'Identifying key contributions to information science', revealed how little consensus there is between workers in the field on which areas are the most important.[27]

Mr Vickery, Mr Fairthorne and Mr Line discussed modelling and all had some reservations about whether we really know *what* we are modelling. As Mr Vickery said, it is all right to model the more tractable problems, but so much of what we are concerned with is not quantifiable, at least as yet, and it seems dangerous to draw conclusions from such methods except in those areas where the carry-over from system to model is known to be reliable. Professor Goffman felt that our problems have not been defined and Mr Farradane warned against making facile assumptions, with the contention that we should return to basic research.

Clearly, we have our difficulties and we need a sound basic theory. Mr Fairthorne defined a theory as a set of principles which enable us by inference to arrive at certain conclusions. It sounds like special pleading to contend that the problems of information handling differ from those of all other sciences, but we do have to remember that we are concerned with the processes of human thought and if we had mastered these, the great names of literature would have disappeared into oblivion for the simple reason that their special talents would have become superfluous. Perhaps complete success is a forlorn hope and, for these reasons, positively undesirable, but we should not despair, for in the absence of reliable theory, there is much to be gained from empirical methods. We may yet have the best of both worlds, in the form of methods such as those suggested by Frederik Pohl, without being masters in the sense of achieving maximum efficiency, but with effectiveness far exceeding our present achievements, at an acceptable level of cost.

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DISCUSSION

MR H. MCCALL (Marine Laboratory, Dept. of Agriculture and Fisheries for Scotland) said there was a sentence in Professor Ziman's Fourth Aslib Lecture in *Aslib Proceedings*, May 1970, which could be considered a relevant comment in this discussion. It reads: 'there are moments when the fashionable phrase "pollution of the environment" seems an appropriate epithet for the vast quantities of waste words that flow out of the scientific community and require to be filtered and purified before the information they contain can be put to use'. MR SHARP agreed with Ziman's comment and said that it was a pity that so much effluent was stored in documentary form when it should really have been discarded. He was particularly suspicious of book reviewers' recommendations to buy material, when it was really necessary for us to judge material ourselves, first-hand.

MR P. R. LEWIS (City University) said that in doing research we could be involved in what is classically called 'the Hawthorn Effect', i.e. one in which the very act of carrying out research tended to bring about the desired objective of the research, without regard to the appropriateness of the method, and the effectiveness of its application.

MR MCCALL said that regarding comments on differences in the quality of abstracts, the Marine Laboratory had been asked by FAO to prepare the abstracts of publications it sent to FAO for its *Current Bibliography for Aquatic Sciences and Fisheries*, so that the first sentence or so was in the form of an indicative annotation, followed by the abstract proper. This simplified the work of indexing and annotating the entries in their bibliography. MR SHARP agreed and said that the first sentence of the abstract should set the terms of reference of the publication.

MISS HELEN TOWNLEY (Wellcome Foundation) said that the present situation was such that we were attempting to reach the moon when our only means of transport was jet aircraft. She thought that we did not have the tools available in order to achieve the goals we were aiming at.

MR R. A. FAIRTHORNE (Independent) said that our trouble was that we had not yet sorted out our ends; the various distinct tasks that librarians did were carried out more implicitly than explicitly. The high casualty rates of systems and published papers were the unavoidable casualties of the struggle to find out. Librarianship had no need to feel particularly guilty, nor complacent, about this. The problems were profound. Librarians were not like mathematicians who thought up their own problems, and concentrated on those they could solve. MR SHARP agreed that librarians were in a particularly difficult field here. In doing research in librarianship, one could not foresee the progressive steps from one area to the next as was possible in other disciplines, e.g. mechanical engineering.

MR L. CORBETT (AWRE, Aldermaston) wondered whether we were really making use of the tools at our disposal. Video on-line terminals, for example, were being applied in the publishing and commercial fields, but there was little sign of them in the library field. The same applied to COM (Computer Output on Microfilm) which only a few people in our field were beginning to take notice of. MR SHARP said that in the library field we had to see whether these particular tools would work. With video on-line terminals, for example, we did not know as yet what we wanted to appear on these terminals.

MR B. T. STERN (Wellcome Foundation) said that until more of us had enough time to stop and think, instead of being swept along in the daily work flood, then there would continue to be a shortage of valid applications of new solutions. The research centres could only go so far, as it was essential to consider the validity of each application in terms of cost-effectiveness. This could not be achieved outside the environment in which the solution was to be applied. The research centres could only point the way in general terms. MR SHARP agreed.

THE DIRECTOR pointed out that the staff of Aslib's Research Department were always ready to help members with any problems which might occur in the development of their library and information services, and he invited all members to take advantage of the services which Aslib offers in this field.

Letters to the Editor

PHOTOCOPYING AND THE LAW OF COPYRIGHT

Dear Sir,

The letter of Garfield and Sophar of 10th September assumes that an author has an unlimited copyright in his work when it is published. As far as British law is concerned, this is not the case, for the British Act states specifically 'that nothing in the act prevents fair dealing for the purpose of private study or research'. It is true that there is no precise definition of 'fair dealing'. Unless and until such a definition exists which makes the current NLL practice improper, it is highly contentious to talk of the National Lending Library as a 'copyright violator'.

It should not be forgotten that the authors of nearly all the items the NLL copies receive nothing for their works and that all authors rely on libraries such as the NLL to assist them in their writings. Thus as far as the author is concerned, copying can hardly be described as unfair.

In considering library copying it should be appreciated that nearly all the items copied in a library such as the NLL are articles in periodicals. Most publishers organize their periodical production to cater for the demand for current copies and often parts are out of print very shortly after publication. It is thus unrealistic to imagine that publishers suffer any significant losses due to library copying of such items.

Yours faithfully,

D. J. URQUHART
Director

National Lending Library
for Science and Technology,
Walton,
Boston Spa,
Yorks. LS23 7BQ.
1st December 1970

Dear Sir,

The letter in the November 1970 issue from Dr Garfield and Dr Sophar on the law relating to copyright raises an important issue, but while being legalistically correct they are, I suggest, tilting at the wrong windmill.

Within my organization we make a relatively large number of single copies of periodical articles. Most members of the staff prefer to have a photocopy of an important article rather than carry away a heavy bound volume; the ease with which single copies of journals can disappear in the pile of papers to be found on the desk of most academics makes me encourage them to have a photocopy rather than to take unbound issues from the library. This process does not result in any financial loss to publishers or authors, for we can certainly not justify the duplication of purchases of expensive scientific and technical journals; its only effect is that overall the library is a more satisfactory place for the users, in that they can expect to find more journals for immediate consultation. There is, admittedly, a copying cost, which amounts to possibly 15 per cent of the cost of periodical purchases, but as none of this falls directly on the library budget, it cannot deduct from the purchases of periodicals.

However, we are no exception to the general rule that there is a limit to the available funds, and it is necessary to borrow many items from other libraries. In the United Kingdom this used to be—and, I understand, in many respects in the United States still is—a very inefficient process. For the experienced librarian, with a large circle of professional friends, it was not too difficult, though often time-consuming, to locate and arrange for the loan of any particular journal, but the relative newcomer suffered many frustrations. The development of the National Lending Library has changed the situation dramatically and now the arrangements for borrowing scientific and technical periodicals are as near perfect as one can reasonably expect. An important by-product of this, which is often forgotten, is that it has also resulted in considerable saving in time and cost to the many individual libraries; the journal loans we make to other libraries are now less than 15 per cent of those made ten years ago.

It is the excellence of the lending service, and not the extension of this service to provide photocopies, which in my opinion represents the real and serious threat to publishers of scientific and technical journals. The provision by the NLL of photocopies is a side issue, being only a matter of convenience and efficiency, in exactly the same way as providing photocopies from journals in my own library is a matter of convenience and, I hope, efficiency. With the NLL it saves postage costs and the time of the library staff in recording, chasing and finally packing periodicals for return, but it does not make available a single item which we would not otherwise be able to obtain.

The article by Brookes to which Dr Garfield and Dr Sophar refer was related to the economic justification for purchasing periodicals as against borrowing. When I established the library some twenty-five years ago, the position regarding borrowing was chaotic and the decision to purchase many of the journals was made because of the known difficulty of being able to borrow copies. Unfortunately, that is from the viewpoint of economic efficiency, users become accustomed to seeing certain journals in the library and become upset if they disappear; also as a librarian, one has a reluctance to cease subscribing to a journal of which the library has a respectable run. However, were I now starting afresh I should apply far stricter criteria as regards the journals purchased for the library. As it is, I am reasonably certain that it would be possible to cut the cost of the present periodical purchases by 40 per cent and, by using the savings for other purposes, improve the overall efficiency of the library. This would be possible not because the NLL provides photocopies, but because it provides a prompt and efficient service for borrowing periodicals and it is this, far more than the question of photocopies, which should be worrying the publishers. The implications of the article by Brookes are very serious. If, as librarians, we all, taking a short-term and selfish economic viewpoint, acted logically and sensibly, then the resultant overall drop in subscriptions to journals could pose many problems. Either journals would cease to exist or prices would have to be raised considerably and in the end it might be that we would find ourselves paying just as much for fewer journals.

Currently there is an agitation by the Society of Authors for some form of financial reimbursement in regard to the books, mainly novels, lent by public libraries. Now that there exists a lending service performing a similar task for scientific and technical literature, it may be that the Publishers Association may make similar attempts on behalf of their members. However, contrary to the statement by Dr Garfield and Dr Sophar, it would not be a case of demanding royalties for each photocopy made by the NLL, but for each copy lent.

I would add that, as a librarian, I certainly am not advocating this procedure, but if the implications of Brookes's article are accepted and acted on by a number of libraries, it may well be that a situation will arise where some form of financial support will be required.

Yours faithfully,
C. W. CLEVERDON
Librarian

Cranfield Institute of Technology,
Cranfield,
Bedford.
23rd November 1970

Dear Sir,

Messrs. Garfield and Sophar may be forgiven for misunderstanding, on the other side of the Atlantic, the complexities of the United Kingdom law on copyright in relation to photocopying, since it is sometimes so badly misunderstood at home. In fact, the passage from the Dainton Report with which their discussion begins is itself completely inaccurate: what is inadmissible (under Section 7 of the Act and Regulations) is not making a profit on photocopying, but making a loss—though it is true that a library cannot take advantage of this section if it is established or conducted for profit. This, however, is nothing to do with fair dealing. In UK law, the copying of copyright material is *not* an infringement of copyright if it is fair dealing for certain purposes, irrespective of the person or organization doing the copying; neither is it an infringement if it is done by a library within the limitations of Section 7. It would thus be useless for a publisher to sue in the British courts for copying which falls in either of these categories.

When your correspondents are so confused about the legal position (which is easily ascertained by anyone who will take the trouble), no weight can be attached to their conjecture about what actually happens (which it would be difficult to discover even by detailed enquiry on the spot), even though they introduce it with the phrase 'it is certain'.

Yours faithfully,
G. WOLEDGE

Greenbank,
John Street,
Rawdon,
Leeds, LS19 6HR.
29th November 1970

Dear Sir,

THE FOREIGN-LANGUAGE BARRIER

I feel I must disagree with Mr Line's observations about translations in his paper in your November 1970 issue (p. 565). The NLL does, of course, maintain a national translation centre in the sense that it is both commissioning translations and collecting them. As far as I am aware, this is the biggest centre of this sort in Western Europe. Nevertheless, it should be appreciated that, whilst translation activities are expensive, they are at present only covering a small fraction of the foreign language literature. To improve the situation, I suggested that scientists should endeavour to learn, not more languages, but different languages. Mr Line does not appear to have appreciated the point that the language barrier would be less troublesome to the scientific community if the foreign language effort in the schools were more evenly divided between the major languages. This would increase the probability that a research team between them could tackle a larger number of languages. (At present, when nearly every potential scientist learns French at school, the language capacity of a research team is often limited to that language.) There is surely no doubt that this approach would improve the cost-effectiveness by increasing the effectiveness without increasing the cost.

Yours faithfully,
D. J. URQUHART
Director

National Lending Library
for Science and Technology,
Walton,
Boston Spa,
Yorks. LS23 7BQ.
2nd December 1970

Dear Sir,

TECHNOLOGICAL GATEKEEPERS

May I belatedly reply to Mr Yates' article on the 'formalization of the role of the "technological gatekeeper" ' in the October issue of *Aslib Proceedings*.

It may well be that no formal report of a system formalizing the link to experts within an organization has been written. However, each special librarian and information scientist is taught, at the outset, to establish who the experts are within his or her organization and to use them whenever applicable. Few, it is true, actually record the details in a duplicated form, but several have card indexes which are in constant use and have been for several years. Within the J. Lyons Group of Companies we established a contact index, or 'Subject Expertise Register' as we call it, in December 1969, following a survey of the Group in mid-1969. A computer has been used to manipulate the data which is compatible with information from other sources. We have not found it appropriate to do as Pilkington do and rigidly define the role of the experts, although this was considered. The Register was duplicated and distributed to key points in the Group in January 1970. It is currently being updated.

Yours faithfully,

P. O'N. HOEY

Manager

Group Scientific Information Service,
J. Lyons & Co. Ltd.,
149 Hammersmith Road,
London W14.
3rd December 1970

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

Note: These categories have been revised since the December 1969 list.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation, professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

*Items are available in the Aslib library and may be borrowed unless marked * to indicate reference copies.*

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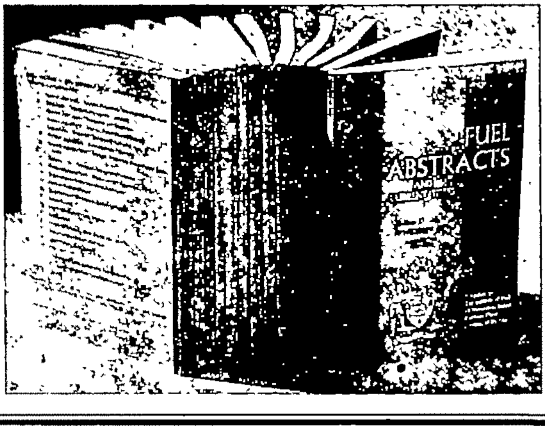

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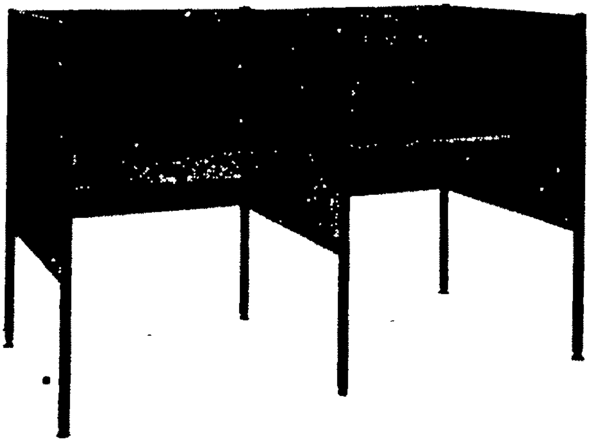

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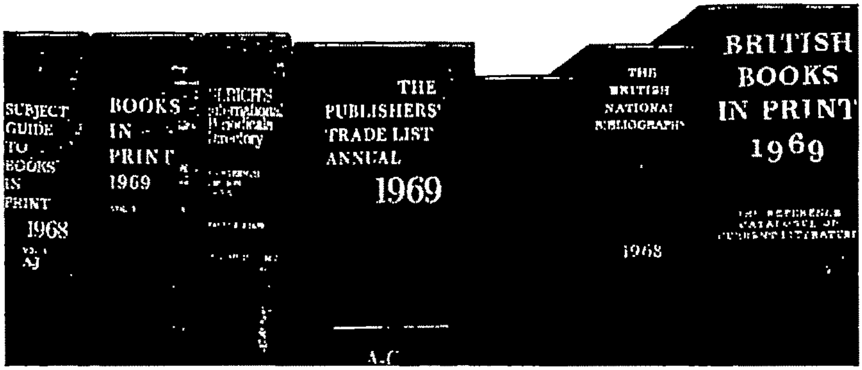
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ULRICH'S
THE PUBLISHERS' TRADE LIST ANNUAL 1969
THE BRITISH NATIONAL BIBLIOGRAPHY 1968
BRITISH BOOKS IN PRINT 1969

ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 23 February 1971 Number 2

ASLIB CALENDAR 1971

March

THU.4.	Economics Group evening meeting and lecture: 'Some businessmen's views on business information services: a forum'. Aslib. 5 for 5.30 p.m.
MON.8.	Transport Group Annual General Meeting, sherry party and evening lecture. Aslib. 5 p.m.
WED.10.	Engineering Group one-day meeting: 'Information for metrication'. Aslib. 10.30 a.m.
MON.15.	Co-ordinate Indexing Group meeting and lecture. Aslib. 3.30 p.m.
WED.17.	Aslib Evening Meeting. 'The Scottish Poisons Bureau', by Dr H. Matthew. Imperial College, London. 5 for 5.30 p.m.
MON.22.	Computer Applications Group Circulation Working Party. Repeat of one-day symposium: 'Computer-aided systems'. Aslib.
THU.25.	Midlands Branch Annual General Meeting, sherry and buffet. Engineering and Building Centre, Birmingham. 7 p.m.
MON.29–WED.31.	Transport Group Course: 'Effective library management'. Missenden Abbey, Bucks.
WED.31–FRI.2.	Chemical Group Conference: 'Infochem' 70s'. University of Surrey, Guildford.

April

THU.15.	Social Sciences Group meeting and lecture, by Dr N. Bradburn (Director of National Opinion Research Centre, USA). Aslib. 5.30 p.m.
THU.15–FRI.16.	Co-ordinate Indexing Group Annual Conference: 'Thesauri: construction, development and evaluation'. University of Surrey, Guildford.
FRI.16.	Textile Group Annual General Meeting. Aslib. 11.30 a.m.
MON.19–WED.21.	Chemical Group course: 'The nature and language of chemistry'. Courland Grove Hall, Wandsworth.
WED.21.	Aslib Evening Meeting. 'Controlled circulation journals', by R. J. Findlay and W. Streatfeild (Morgan-Grampian Ltd). Imperial College, London. 5 for 5.30 p.m.
	Chemical Group Annual General Meeting and lecture: 'A Canadian's view of the UK Information Scene', by Dr F. W. Matthews (ICI). Rembrandt Hotel, London. 11.30 a.m.
THU.29–SAT.1.	Midlands/Northern Branch Joint Conference. Royal Cambridge Hotel, Cambridge.

June

WED.9.	5th Aslib Annual Lecture by Dr H. Coblans: 'Words and documents'. Senate House, London University. 6 p.m.

The British Library

As members may have seen in the national press, the creation of a national libraries organization, to be called The British Library, and the building of a new national library for reference and research on the Bloomsbury site next door to the British Museum, were announced in a White Paper, 'The British Library', published on 13th January.

The British Library will be established by combining the Library Departments of the British Museum (which includes the National Reference Library of Science and Invention) with the National Central Library, the National Lending Library for Science and Technology and the British National Bibliography. The project may take as much as thirteen years to complete and will cost some £36 million.

Aslib welcomes the proposals of the White Paper, which it recognizes as being broadly in line with the evidence it submitted to the National Libraries Committee, which reported to the Government in June 1969. Copies of the White Paper are available in the Aslib Library and may be loaned on request.

The Scottish Poisons Bureau

The subject of the Aslib evening meeting to be held on Wednesday, 17th March, at the Imperial College of Science and Technology will be 'The Scottish Poisons Bureau'. The speaker will be Dr Henry Matthew, FRCP (Edin.), Physician in Charge, Regional Poisoning Treatment Centre, and. Director of the Scottish Poisons Information Bureau, Royal Infirmary, Edinburgh.

Acute poisoning is a common medical emergency, as many deaths occurring each year from poisoning and gassing as from accidents on the roads. Poisoning, however, receives little attention and tends to be the Cinderella of the medical curriculum. Dr Matthew will present evidence to show the frequency of poisoning in various countries. An attempt will be made to explain the remarkable and recently alarming increase in the incidence of poisoning.

The Poisons Information Services in various countries will be described and the organization and work load noted. The background to the compilation of information will be given and the experience of the Scottish Poisons Bureau described.

In addition to his present appointment at the Royal Infirmary, Edinburgh, Dr Matthew is a member of the Government Committee on Treatment of Poisoning and of the Home Office Advisory Committee on Drug Dependence.

The Chairman of the meeting will be Mr Philip Wade, Librarian of the Royal Society of Medicine.

Engineering Group: 'Information for metrication'

The Aslib Engineering Group is holding a one-day conference on 'Information for metrication' at Aslib headquarters on Wednesday, 10th March. The purpose of the conference is to acquaint engineering librarians/information officers with the various sources of metrication information, so that they may be better equipped to assist their organizations with the implementation of metrication programmes.

The programme will open with a short introduction from Mr N. Stone, Chief

Information Officer at the Metrication Board, and this will be followed by a talk on 'Sources of Information' by Mr M. J. B. Jones, Metrication Officer at the GKN Group Technology Centre. Messrs H. C. Hodge and P. J. Lynn of the Metrication Working Group, Civil Service Department, will speak on 'Training aids for metrication', and the conference will end with an open forum in which the four speakers will deal with questions from the floor. The Chairman of the conference will be Mr H. R. Stevens, Information Officer of the BHRA and Chairman of the Aslib Engineering Group.

Further information may be obtained from Mr D. M. Trubshaw, Hon. Secretary, Aslib Engineering Group, 6 Willow Drive, Countesthorpe, Leicestershire.

Social Sciences Group: 1st Annual Conference report

We have often been told how rich are British libraries in primary sources for research and how fortunate we are in having within a square mile in the city of London an unrivalled wealth of raw material to which the scholars of the world are attracted in such numbers as to create acute problems of work space. How well the social scientist fares in the scramble for seats and a foot of table top compared with, say, the historian or the literary scholar, has never been studied. What is, however, known from practical experience and expression in such reports as those of the Heyworth Committee on social studies and the Parry Committee on university libraries, is that he is far less likely to find what he wants when he gets there. Recommendations for improving the supply of the often fugitive and ephemeral material that is essential to research throughout the social sciences were conspicuously lacking from the recent Dainton Report on national libraries. Having identified the problem the Committee promptly dismissed it as something which the forthcoming national library authority should look into. In the meantime, some valuable materials are not being collected by anyone and, perhaps worse, irreplaceable records are being discarded by individuals and bodies who are unable or unwilling to preserve them.

Speaking at the Aslib Social Sciences Group conference on primary materials which took place at Loughborough University from 1st to 3rd January, Professor Dennis Swann advocated a network of what he called DCLE's (Designated Centres of Library Excellence) which would collect everything in their respective fields (for example, industrial relations at Warwick). Dr George Bain and Dr Michael Rush saw virtue in the notion of a National Documents Library for the social sciences and found support from the floor. Librarians from LSE and the BM naturally felt that any such venture should be based on their own long-standing collections; but how a joint operation could be achieved given the present incompatibility of their financial structures is difficult to conceive.

The need for national co-ordination at least is irrefutable; we are desperate, too, for a national register of specialist collections such as that in Cambridge on historical demography and described at the conference by Mr Peter Laslett. This would undoubtedly reveal areas of inadequacy. Mrs Brenda White, for instance, drew attention to some of the documentary needs of planners that are taxing the resources of the country's information network. Who, for example, is collecting air photographs? Professor Kathleen Jones reported that she had found that the annual and other reports of many voluntary associations had not been thought worth keeping!

Too much reliance, it seems, is placed on the individual researcher and the enthusiastic amateur in the preservation of records. Often the material itself is easy to acquire: one participant had amassed a suitcase full of items on the recent troubles in Northern Ireland. What concerns the social scientist is that such sources should be acquired systematically and preserved in libraries where access to it can be guaranteed.

The National Lending Library for Science and Technology at Boston Spa has shown what can be achieved when a focus for acquisitions of a clearly defined body of materials is established. Certainly, the vast resources of the BM and LSE must be the basis of any national collection of primary sources for the social sciences. But the view was strongly expressed that the way to maximize the nation's document-gathering capacity is to create a nationally-recognized focal point which, in addition to housing materials itself, would also direct deposits to existing specialist collections and offer a referral service to researchers.

FROM *John E. Pemberton*
University of Warwick Library

It is hoped to publish the papers presented at the conference by Professor Swann, Dr Rush and Mrs White, together with a statement of conclusions by Mr Maurice Line, in the April issue of *Proceedings*. The Social Sciences Group are also considering the publication at a later date of the whole conference proceedings. *Ed.*

Audio Visual Group

The Audio Visual Group have held a number of meetings in recent months, reports of which are as follows:

(1) A meeting was held on 2nd October 1970 to which representatives from over twenty organizations known to be concerned with the exploitation of audio visual materials were invited. The purpose of the meeting was to discuss areas of overlapping interest between these organizations and, if necessary, to investigate the possibilities of future co-operation and liaison. Library Association, University Libraries and Educational Technology Groups were some of those represented.

As a result of the meeting the Aslib Audio Visual Group agreed to act as a clearing house for information concerning forthcoming conferences, meetings publications etc. for a trial period of a year, and invited those present to supply information on their activities for circulation. The first newsletter was sent out in January 1971, and will appear at quarterly intervals during the year.

(2) A Film Workshop was held between 16th–20th November designed for staff in film libraries of all types to give them an introduction to the best methods of handling, controlling, storing, cataloguing, classifying and exploiting film material. Over 35 delegates attended the course which included visits to the

film libraries of the BBC, Visnews, Imperial War Museum and the British Film Institute.

Speakers at the course were: John Huntley, British Film Institute; David Grenfell, Radio Telefis Eirann; Pat Holder, British Movietone News; Roger Holman, National Film Archive; John Davie, IBM (UK) Ltd; Frances Thorpe, Slade Film Department; Graham Murray, Granada Television Ltd; Betty Smith, University of Birmingham; Sylvia McColvin, Inner London Education Authority; Harold Brown, National Film Archive; Keith Owen, BBC; Helen Harrison, Open University; Anthony Crocker, National Audio Visual Aids Centre.

(3) The National Council for Educational Technology and the AV Group held a joint conference in Hull on 3rd–6th December to produce recommendations for the Universities Grants Committee and the Department of Education and Science for the development of libraries in Higher Education, with particular emphasis on the impact of non-book materials. The conference, which was reported in the *Times Educational Supplement* of 11th December, was attended by librarians from Universities, Colleges of Education and Further Education, and Educational Technologists working in higher education.

(4) Members of the AV Group Committee are currently involved in discussions with the National Council for Educational Technology on the provision of appropriate cataloguing rules for non-book materials along with representatives from BNB, OSTI and the LA Cataloguing Rules Sub-Committee.

Survey of manpower in library and information work: Aslib pilot study

The Department of Education and Science is shortly to undertake a national survey of manpower in librarianship and information work. The purposes of the survey are to obtain an up-to-date picture of the types of qualification held by librarians and information workers; to ascertain the likely demand at the various levels over the next few years so that provision for education and training can be planned more effectively; and to determine the needs for the supplementary skills increasingly required in operating library and information services.

In order to advise on the final form of the questionnaire to be used in the national survey, Aslib's Research Department has been carrying out a pilot study, amongst fifteen librarians, in the form of a postal questionnaire followed by personal interviews. These librarians are being asked both to examine critically the questionnaire itself and point to any problems they may have in completing it, and also to supply certain qualitative material on such matters as, for example, re-training courses for librarians, the Library Association Mature Registration Scheme, and their attitudes to the employment of married women, with professional library qualifications, who may wish to return to the profession after some years' absence.

It is intended that the final questionnaire will cover the following categories: staff with a formal qualification in librarianship or information science plus a degree or equivalent in another subject; staff with only one of these qualifications; and staff with neither. The DES intend to launch the national survey in

March 1971 and to cover as many as possible of the libraries and information centres in the United Kingdom.

OSTI policy on information science research

The Advisory Committee for Scientific and Technical Information recently reconsidered OSTI policy for the support of research in information science and has recommended that, as the continued development of information-handling methods depends increasingly on a supply of new ideas from theoretical and experimental research, OSTI should seek to encourage the growth of such research.

In order to explore promising areas in greater depth, OSTI should sponsor the preparation of detailed review studies. One such study, 'A review of the literature on primary communications', is already being undertaken by Aslib's Research Department and it is hoped to publish the results of the study in the near future as a further part in the Aslib Occasional Publication Series.

OSTI also hope to commission reviews on evaluation of information retrieval systems, man–machine interaction and the application of psychological and sociological research techniques in information studies.

Thesauri in the Aslib Library

The Aslib Library has compiled a list of thesauri collected by them up to December 1970 and copies are available on request. The Library is anxious to maintain a comprehensive collection of English-language thesauri and would be grateful if any organization which has constructed its own thesauri would send copies or notification of their existence to the Librarian.

Social science materials: an SSRC investigation

The Social Science Research Council has awarded a consultancy to Mr John E. Pemberton, Sub-Librarian of Warwick University, to carry out a broad review of the present position with regard to the collecting of printed ephemera and semi-ephemera in the social sciences.

Mr Pemberton is a Committee member of the Aslib Social Sciences Group and organizer of its conference on primary materials (see report above). He has argued the case for better national provision of these materials for some time. In a paper in 1969 (*Aslib Proceedings,* **22,** 1, Jan. 1970, p. 22–9) he suggested the creation of a National Documents Library as a possible solution to the problem, and urged the newly formed Group to give a lead in working towards commonly agreed goals. Since then, a good deal of progress has been made in Committee on defining objectives.

The results of Mr Pemberton's investigation, which will cover university libraries and the libraries of learned and professional societies, should materially help in the formulation of a national library policy for the social sciences. It is hoped that the report will be available by September 1971.

An intermediate lexicon for information science

OSTI has awarded a grant of £8,690 over eighteen months to the School of Librarianship, North-Western Polytechnic, for a project to elaborate and test an 'intermediate lexicon' for information science. The project will be under the supervision of Mr J. Mills, Head of Research at the School, and Mr E. J. Coates, Editor of *British Technology Index*, in association with Aslib, the Classification Research Group, and the Library Association.

In the first phase the research staff will extend the outline version of a lexicon which has recently become available following prolonged international discussions initiated by the Groupe d'Etude sur l'Information Scientifique in France. The full lexicon is expected to contain 1,500–2,000 terms.

In the second phase, the investigators will carry out tests intended to provide information on the properties of the elaborated lexicon as a conversion device between indexing systems.

Who's Who in librarianship and information work

A new edition of *Who's Who in librarianship and information work* is currently in preparation, to be published by Abelard-Schumann. A questionnaire is enclosed with this issue of *Aslib Proceedings* and readers, who have not already done so, are asked to complete it and return it by 31st March to the Editor, Mr Thomas Landau, ALA, AI Inf Sc, 139 Chevening Road, London NW6. In order to keep the cost of compilation and therefore the published price as low as possible, it will not be possible to send reminders to those who have not sent in their forms.

The grades of staff to be included will be the same as in the first edition: chartered librarians, information scientists, and full-time librarians and information officers in special libraries who have special subject qualifications.

LA Industrial Librarians Group

The Council of the Library Association has approved the formation of an Industrial Librarians Group. This Group has been set up to bring together those members who are employed in, or concerned with, industrial and commercial libraries and information units and to further their interests within the Association.

It is important to note that the Group's name will not be printed this year on the Library Association membership renewal form. LA members who wish to join the Group should notify the Secretary, Mr H. Barry.

European Association of Scientific Information Dissemination Centres

Fifty-four participants from twelve countries attended the first meeting of the European Association of Scientific Information Dissemination Centres (EUSIDIC) held on 23rd–25th November 1970 in Frankfurt/Main. Also present were observers from FID, Unesco, OECD and the American sister organization, ASIDIC.

Papers presented included a report on a thesaurus for chemical engineering, being prepared by DECHEMA in Frankfurt, and a report on on-line connections to data banks through telex. Other subjects were discussed including experiences with data bases, reports on chemical information activities in several countries, and international collaboration.

The next meeting of EUSIDIC will be held in Paris in early May 1971. Further information can be obtained from the Secretary of EUSIDIC, Dr A. K. Kent, UKCIS, The University, Nottingham.

Standard book page sizes

Following the printing industry's plan to use metric units in the production of books by the end of 1970, the British Standards Institution has revised its standard on the page sizes of books. BS 1413 *Page sizes of books* was first published in 1966, when it gave eight imperial sizes. The new edition now gives five metric sizes, including one ISO A size. The latter has been included for its usefulness in special publications such as technical handbooks for which the usual paperback sizes are too small.

The standard has been prepared at the request of the British Federation of Master Printers and the Publishers Association following the issue of their joint publication *Metric sizes for book production.* Copies of BS 1413 : 1970 are obtainable from BSI Sales Branch, 101 Pentonville Road, London N1 9ND. Price by post 35p (subscribers 30p).

New standards for microcopying

Two new standards in the field of microcopying have also recently been published by the BSI. BS 4657 *Method for determining the resolution obtained in microcopying* specifies a test pattern consisting of two sets of five parallel lines at right angles. Such patterns of sizes differing by about 12 per cent are arranged in a test chart. A test procedure is given for the use of the test chart to determine the smallest resolved pattern, and from calculation of this an assessment of resolution is obtained.

The new part of BS 4210 *35 mm microcopying of engineering drawings and associated data* is Part 2.1 *Photographic requirements for silver film.* This is also concerned with resolution and specifies the resolution to be achieved by a given camera, film and development combination, or in the microcopies produced from a particular combination.

Copies of these standards are 50p each and can be obtained from the BSI Sales Branch, 101 Pentonville Road, London N1 9ND.

New parts of the UDC

New sections which have recently been added to the BSI's English Full Edition of the Universal Decimal Classification are:

(1) BS 1000 (616) *Pathology* which covers in its principal divisions the circulation, respiratory system, digestive system, haemopoietic organs, dermatology, genito-urinary system, locomotive organs, neurology and infectious diseases;

(2) BS 1000 (655) *Graphic industries. Printing. Publishing. Book trade* which deals with the history and antecedents of printing, processes such as the production of printing surfaces (letterpress, intaglio, lithographic, stencil and screen), typographic design, presswork and machine finishing processes, and all aspects of publishing and bookselling. It does not, however, provide for the mechanical details of the machinery and equipment, which are dealt with in another section —UDC 681.6—to be published shortly.

BS 1000 (616) costs £3.25 and BS 1000 (655) 95p and both are obtainable from the BSI Sales Branch at the address above.

Institute of Information Scientists: Scottish Branch

The next meeting will be held on Thursday, 4th March, at 7 p.m. in the Mountbatten Building, Heriot-Watt University, Edinburgh, when Mr S. R. Hook (Scottish Office, Management Services) will speak on 'Job evaluation'.

People and Places

DR HERBERT COBLANS, Managing Editor of the *Journal of Documentation* and formerly a member of the staff of Aslib, has been made an Honorary Research Fellow in the School of Library, Archives and Information Studies, University College, London.

MR A. P. J. EDWARDS, a member of the staff of OSTI since its inception, has transferred to the University Grants Committee. His responsibility for OSTI's educational activities will pass to MR A. N. MACGREGOR, who is already responsible for social science information activities.

MR B. J. PERRY, who was a PSO at OSTI Headquarters until he retired for domestic reasons in September 1969, has returned to OSTI in a newly created post, where he has charge of all general, as distinct from subject-based, activities.

BRIEF REVIEWS

ANDERSON, BERYL L. Special libraries and information centres in Canada: a directory, 1970 revision, compiled for the Canadian Association of Special Libraries and Information Services. Ottawa, Canadian Library Association, 1970. 168 pp. (SBN 0 88802 0/0 9).

This is a revised edition of *Special Libraries in Canada: a directory,* published in 1967. The entries give location, name of the person in charge, founding date, numbers of staff, holdings of books, reports, periodicals and specialized material, and the subject fields for each library. Entries are in English or French, as given by the library concerned.

ECONOMIC STATISTICS COLLECTIONS: a directory of research resources in the United Kingdom for business, industry and public affairs. Published for The Committee of Librarians and Statisticians (Library Association and Royal Statistical Society). London, Library Association, 1970. 61 pp. £2 (£1.50 to members). (SBN 85365 132 9).

This directory has been based on some of the results of a survey undertaken to obtain information on the nature and, more especially, on the locations of statistical material held by various organizations in the UK. While a union list of statistical serials regularly received by public, university, professional associations' and government libraries is to be published at a later date, this directory is based on statistics mainly collected irregularly by business firms, trade and other associations, and by trade unions.

The main section is arranged in four parts: (1) London, subdivided by postal area; (2) English counties and Wales; (3) Scotland; (4) Northern Ireland and Isle of Man. The main entries, in alphabetical order within their sub-sections but with running numbers throughout, contain brief information on the scope of the statistics. The subjects covered are divided into the categories of the questionnaire, and there is a list of subject areas of collections, a name index, and an index of special topics: those specifically associated with the special interests of owners of collections.

Bearing in mind that not necessarily all holdings of statistics are included, this list should nevertheless prove valuable to research workers dealing in statistics in most fields.

ENCYCLOPEDIA OF ASSOCIATIONS. 6th edition. Vol. 1, National organizations of the United States. Detroit, Gale Research Co., 1970. 1468 pp. $32.50.

The last edition of this publication appeared in 1968 and the editors estimate that in the 1970 edition there has been an alteration in more than 90 per cent of the previous entries and there are over 1,100 new entries. The details given for each organization include address, purpose and objectives, name of chief executive, number of members, publications and convention schedules.

The bodies listed include, amongst others, non-profit making American membership organizations, American local and regional groups of national interest and citizen action groups. Some foreign groups of interest in America are shown as well as a title entry for organizations which, from the names, seem to fall within the above categories but are actually commercial non-membership bodies. There is also a section giving defunct, inactive or former names of organizations. This is an invaluable source for tracing details of American associations.

NATIONAL TECHNICAL INFORMATION SERVICES: worldwide directory. 3rd edition. Compiled by the Technical Information Service, National Research Council of Canada, for Study Committee 'Information for Industry' of the International Federation for Documentation (FID/II). FID, 1970. 61 pp. 15 guilders. (FID No. 464).

This is a guide to the major channel in each country through which sources of technical information in any field can be located by enquirers unfamiliar with that country's technical facilities. The publication has been kept simple, inexpensive and limited to that information essential for initiating enquiries.

The organizations are listed in the *Directory* under the names of the various countries, which have been arranged alphabetically. In countries where no national technical information services exist, organizations which have agreed to act as referral centres or in a liaison capacity have been listed, but few details are given. Only the entries for organizations which serve as national centres include information on the extent of their activities and the types of services offered.

VARA, ALBERT C. Food and beverage industries: a bibliography and guidebook. Detroit, Gale Research Co., 1970. 215 pp. $11.50.

This bibliography deals with the many aspects of the food and beverage (alcoholic and non-alcoholic) industries, such as research, production, distribution and world food problems. Sources of information include books, articles, government publications (national and international), private industry, research agencies and trade associations. Most of the sources cited are American and have been seen by the author.

Author, subject and keyword title indexes refer the reader, by page number, to entries which are arranged in subject sections, but unfortunately the entries are not numbered. This, in certain cases, leads to some difficulty in identifying a particular reference, since the layout of the references is not very clear and the use of capitals may lead to some confusion. However, the guide should still prove useful to those seeking sources of information in the food and beverage industries.

A CASE STUDY IN THE PROBLEMS OF INFORMATION PROCESSING IN A SOCIAL SCIENCE FIELD: THE OSTI-*SEA* PROJECT

V. A. WINN

The Open University

Paper presented at a meeting of the Social Sciences Group, 17th June 1970

Background

The *Sociology of Education Abstracts* project, funded by OSTI (Office for Scientific and Technical Information of the Department of Education and Science), is a three-year project, now, after eighteen months, entering its second phase. The first phase has been concerned with (a) an analysis of *SEA* practice with regard to selection and abstracting, (b) consultation with specialists over questions relating to the dissemination of information in the sociology of education, and (c) experimentation with selected methods of subject indexing.

As a result of this work, recommendations as to improvements in the *SEA* service were made to *SEA*'s Editor, and guidelines were formulated. At the same time the guidelines will provide a framework for the second phase of the OSTI project—the subject indexing of a bibliography of literature relevant to the sociology of education.

The *SEA* service

The service is in its sixth year, publishing now some 1,100 abstracts per year, and appearing six times per year. Its coverage (*SEA* is international in scope) is very much wider than its name suggests—'Social Foundations of Education' would in some ways be a more appropriate title. However, selection is made with the sociologist of education specifically in mind, rather than educationalists in general. There is often some doubt as to whether the sociology of education 'is' education or sociology. *SEA*'s view is that, although the sociology of education offers insights into educational situations and problems, it 'is' sociology, and this belief is reflected in the coverage of *SEA*.

SEA started as a result of concern felt by a few academics at the beginning of the growth of the literature in their field. A small group joined forces to tackle the problem and to share the results of their labours with colleagues in the field. Gradually some of the colleagues began to participate in these activities. The service that was initiated was thus a service by academics for academics.

It was designed to be (and is still) run upon lines which academics believe to be desirable for academic purposes. It was not conceived of primarily as a tool for the purpose of tracing relevant documents but as a medium for the dissemination of knowledge about sociological research into education, with the object of improving the quality of such research. Associated with this aim is the belief that time spent in working over the literature, or on abstracts of it, is not necessarily time which should be saved—this may be part of the intellectual process. Accordingly, the abstracts are arranged in author order rather than broad subject or classified order. There are two study areas indexes but *SEA* in its present form is basically a journal for current awareness and also for what may be called 'retrospective awareness'.

Abstractors all contribute on a voluntary basis. Books are selected and allocated *ad hoc* by an assistant editor, but each abstractor is solely responsible for specified journals he has opted to cover, which are forwarded directly to him by the publisher. He selects material for inclusion as well as preparing the abstracts, which are signed. The original notion was that abstractors collectively would, in reporting the current literature, reflect the range of concerns of sociologists of education in general, thus avoiding any possibility of 'mandarinism' on the part of editorial staff. The fallacy here has long since been apparent—that each abstractor sees only some portion, not the total range of publications. The result is therefore a sum of different individual decisions, not a consensus or collective decision making.

From the user's point of view this is said not to matter greatly. With knowledge of the individual abstractor, possible bias can be detected. However, we have evidence to support the suspicion that whilst reliability is quite high (i.e. the extent to which the individual abstractor can maintain consistency of decision making), validity is less satisfactory (i.e. consistency across abstractors is not high).[1]

It is intended therefore to introduce some measure of standardization; hitherto abstractors have received no guidance—their brief has been simply to deal with their material as they judge appropriate in the light of *SEA*'s general aims. But it is felt that guidelines must be as flexible as possible, the aim being similar treatment for similar items, and not any notion of 'standard practice'. To formalize too far would be to destroy one of *SEA*'s major strengths—the fact that specialist literature is treated by specialists.* An important point often overlooked is that *SEA* is something other than a service to the field—it is part of it. The contributors are on the whole trusted to select without prejudice and to report without distortion. Yet much of the material they handle is such that perception of the 'subject' depends upon an understanding of the conceptual basis of the work.† The need to avoid either superficiality (thus missing the point) or subjectivity (thus distortion) makes inevitable an overt attempt at interpretation. The quality of the attempt is of the greatest importance. Poised between Scylla and Charybdis, this is of course to participate in the academic debate.

Since *SEA*'s early days the amount of relevant literature has considerably increased and in addition *SEA* is covering a higher proportion of the literature. The body of abstractors, too, has grown. Whereas initially this body was small and compact, all the contributors known to each other personally, sharing a common view and purpose with regard to *SEA*, this is no longer the case. The number and variety of users has similarly increased. The growth and diversification have reached the point at which the service cannot for much longer be used as intended. The back files are almost too big for the individual to do his own detailed sifting and sorting, even after *SEA*'s preliminary selection from the total output.

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* 'Specialist' (adjective) is a term variously used to indicate 'advanced', 'technical', 'great detail', 'in narrow study area' etc. It is here used to comprehend material of interest to a particular group of specialists (i.e. those focusing upon a particular area of study). The defining characteristic is perceived relevance, and is not inherent in the material itself. The question of relevance is further discussed later.

† 'Subject' is here used in distinction from the 'subject matter' with which exposition of 'subject' is for the writer's purposes associated—an important distinction to which it will similarly be necessary to return later.

The project

It was to enable *SEA* to develop as an IR system, as distinct from an 'awareness' service, that the OSTI project was set up. The aim was specified as: 'to develop a [retrieval] system which will meet the information needs, patterns of enquiry and preferences as to type of service of its users'. The system should be eventually, though not necessarily immediately, computer assisted. The brief was extremely general.

The general plan was as a first stage to survey *SEA*'s present practice of which, with the devolution of responsibility on to abstractors, there was no detailed knowledge. This gave us some information as to how at least some sociologists think different types of work should be treated and what types of work should figure in *SEA*. Additionally it was necessary to collect user's views as to desirable form or direction of development. The object of this stage was to 'funnel down' the possible range of alternative types of service, to formulate specifications and to refine criteria for the future service, or rather to provide the necessary evidence to enable the Editor to make informed policy decisions on such matters.

Following this, further stages were seen to include experiment, development, optimization and evaluation of an appropriate type of service (abstracts or other—it was completely open-ended), the focus being upon the intellectual organization of the literature. Clearly intellectual questions cannot be entirely divorced from other aspects of a service—administrative, personnel, financial, etc. However, it is plainly good planning policy to formulate objectives first in ideal terms; alternatives may then be measured against the ideal rather than asking 'what can we get for what we can afford?', and by reorganization of resources it may be possible for the same outlay to approach much nearer to the ideal.

If forced to classify the project under one of the headings, say, of the *Annual Review of Information Science and Technology*, it would perhaps be placed under 'user studies', although it is less a study *of* users—as is the case with much of the work so described—than a study *with* (i.e. enlisting the aid of) users. A social science service would be unwise to assume that the effectiveness of its service is judged by the same criteria as services to natural or physical sciences. It cannot be assumed that speed of searching is necessarily important or that the recall/precision ratio has any bearing on effectiveness. The user is for *SEA* the judge of 'what matters', and we have to discover 'what matters' before we have any valid yardstick by which to direct our work and to assess our progress. But users can only judge by what they know. Hence experimentation etc. and formulation of criteria must be concurrent and interactive processes in which users participate at all stages.

An alternative classification of our project in the *Annual Review* would be as 'system design' but this too might be misleading. We certainly view the service in system terms—a series of processes (tracing new publications, selection, abstracting, on to the final distribution) and a set of components (personnel, equipment etc.). These must operate within certain constraints (policy, finance etc.). We are not however using any of the formal management techniques and, at the moment at any rate, are not thinking in terms of the kinds of criteria which would be susceptible to this type of approach.

In a sense our project may be said to be parasitical. The project is studying existing ideas and techniques, in order to assess with users their effectiveness in the *SEA* context and to modify in the light of a resulting better understanding of users' criteria. On the other hand, in relation to other work the *SEA* project may be seen as a case study in the problems of information processing in one subject field, a social science one, whereas most work on individual fields has hitherto centred on science fields. This is very much its status *vis à vis* Maurice Line's INFROSS investigation.* Equally it may be used as a test-bed for techniques developed by others; this has been so in the case of the BNB's new PRECIS indexing system.† This kind of co-operation appears to be fruitful for all those involved.

Perhaps we are best described as a case study with a mission! From the point of view of *SEA* itself the purpose is to find ways, which are acceptable in 'discipline' terms, of realizing additional new aims without losing sight of the old ones. In so far as sociology is one of the main disciplines bearing upon the study of education, the project has a wider interest in the context of education. In the wider context still of the social sciences, the sociology of education represents a microcosm of most of the thorniest problems for information processing—a field still fluid and developing, an interdisciplinary area of study, with little standardization of terminology and with shifting boundaries.

Methodology

The main problem in stage 1 was to identify the most important questions and to evolve strategies for collecting data to enable us to answer them. There was a great deal of ground to cover, and it seemed desirable to attempt to study as many aspects of the service as possible even if in a general way, rather than to look at selected aspects only in detail.

In 'studying users', although contextual data on sociologists and educationalists is available (data collected by the INFROSS team), it has still been desirable for us separately to study sociologists of education. It is true that the academic habits, problems and requirements examined by INFROSS are the basis from which we have to work, but it is not only from the views of a representative range of such specialists that we may derive guidance, although such views are factors to be considered. Experts, provided that we engage the participation of a sufficient number to reflect upon and to speak for the 'best' interests of the field, are felt to be the people whom we should regard as arbiters.* 'Discipline' considerations are for *SEA* the overriding factors.

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* 'Investigation into the information requirements of the social sciences', now in progress under the direction of Maurice Line at the Bath University of Technology.

† PRECIS (PRE served Context Subject Index) is a rotated subject index system now under development by Derek Austin at the British National Bibliography.

This sounds perhaps, with its insistence upon the best views and on discipline considerations, somewhat woolly and unlikely to provide effective information for decision-making. But it is one of the 'givens' of the project, whose rationale derives from the nature and ethos of *SEA*. It is felt that not inconsiderable damage might be caused at this stage of the development of the field by a wholly objective or value-free approach to the processing of information. We must therefore confess to being something of a cuckoo in the information nest, but this approach does accord with the intellectual approach of the sociologist.[2]

The questions identified as important include 'is' as well as 'ought' questions. A number of separate studies were conducted in the part of the project just completed. We tried (with differing degrees of success) to vary the approach to suit the kind of question being asked. Some questions were, we felt, best answered by a carefully controlled scientific approach; there were others, answers to which could only be approached by a less 'conventional' approach.

So, for instance, to obtain information about the general extent of knowledge and use of bibliographical services, we questionnaired a representative sample of sociologists of education for their self-reports. To find out about the kinds of queries which present difficulties in searching bibliographical services we felt that a real life situation was preferable to reports after the event, and so an experimental bibliographical enquiry service was set up. With regard to intellectual problems we asked people to *think* and discuss in a fairly informal seminar situation. However we did more than ask 'what sort of service would you like?' In two studies we provided examples of abstracts and indexes and ancillary technical information for members to study, in an effort to enable them to comment in an informed way about the suitability of particular techniques of information science to the particular problems of handling sociological material. These studies produced not answers but more problems, or perhaps the same problems clarified in more of their complexity. The following sections give a general account of some major problems, as we see them, for IR in our field.

Nature of the discipline

The root of the problem of providing an effective service in the sociology of education lies in the nature of the 'parent' discipline (i.e. sociology). Sociologists are still debating that question and it is therefore not desirable, nor would it be proper, for information scientists, to attempt any 'solution'.

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* A confession of circularity must be made at this point. For practical reasons we must depend upon those who can spare us some of their time. Even were this not the case, only experts would be competent to determine the size and composition of a 'sufficient' group of experts, and even then the possible effect of interactions within the group could not be anticipated. In a developing area of study a retrospective approach, e.g. bibliometric methods, is likely—paradoxically—to offer a somewhat less than reliable basis for forward thinking. It is probably the case that any approach to a definition of 'sufficient' which is not retrospective is inevitably in a 'scientific' sense suspect, except in so far as the 'sufficiency' of the group is vindicated (given appropriate control of intervening factors) in evaluation of the eventual service by other experts.

It is all too easy to make assumptions about social sciences by analogy with sciences. It is a truism to note that natural scientists have agreed ways of categorizing and describing the phenomena in which they are interested. The indeterminate boundaries of social science fields have often been the subject of comment (unfavourable comparison). This lack of 'agreement' and indeterminacy are however a natural consequence of the fact that a social science discipline does not deal with a 'special class of empirical data; instead it deals with data as interpreted within a special type of conceptual framework'.[3]

There is fairly general agreement as to the substantive subject matter of, for instance, sociology, but this does not alone constitute a description of the field; other social sciences cover much the same ground. The distinctive characteristic of a social science discipline is the kind of conceptual model employed, in particular the unit of analysis.

The sociologist and the psychologist, for instance, may deal with identical social situations yet, by virtue of a concern with the structure and functioning of human groups, a sociological analysis is quite distinct from a psychological study, the focus of which is the behaviour of the individual. Whilst it is true that the individual person is both an element of the social process and an 'entity' responding to it, there is a conceptual difference between studies of the ways in which the individual as an 'entity' may influence social processes and studies of the individual's response to social situations. The former add to our understanding of the mechanisms of social processes, the latter to our understanding of the functioning of the individual person.

Swift[4] warns of possible difficulty: 'Because we are so used to individuals as concrete things we find it easy to talk in terms of the individual level of abstraction. On the other hand, because the group is not a concrete thing we often find it a difficult idea to deal with . . . .'

SEA nevertheless feels that this kind of distinction is important from the point of view of information processing, in so far as the users of a service are or should be concerned with information and not merely with the 'concrete things' of the empirical world. It is perhaps desirable to make the point that the sociologist is not primarily concerned with human beings nor even human behaviour *per se*, but with the *mechanisms* which account for human behaviour and the concepts (analytical constructs) which he creates for the purposes of *explanation*. These concepts have no exact empirical equivalent. It is less simple to give a positive definition; it is an epistemological problem to decide whether they have an ideal (Platonic) existence beyond the purpose they serve as pigeon holes of the mind. However, providing their particular character is understood, the epistemologists may be left to debate their philosophical status.

Nature of user population

A basic problem for *SEA* is the lack of homogeneity, as 'consumers' of information, of those to whom the literature of the sociology of education is of professional interest. There is not only the marked difference that would be expected between those concerned with the academic study of education and those 'practising' in education but also, and more fundamental for *SEA*, there are differences of approach to the literature within the 'academic' group.

There was broad agreement amongst those questionnaired that a conventional abstracting service was to be preferred to various alternatives in most situations. But on the one hand there is the theoretical approach of the sociologist, and on the other a substantial number of sociologists of education who, whilst having a more pragmatic approach are yet, in the general context of education studies, specialists (in another sense) in the sociology of education. The main difference between these two approaches seems to lie in the extent to which intellectual effort in searching the literature is to be 'delegated' to an information service, although even our 'pragmatists', as sociologists, would be unlikely to deny that from the most elementary level up there must be an informed (sociological) consumer approach, whether the emphasis is on the understanding of educational processes or on the development of sociological theories. Their concern seems to be one of expediency in exploiting the literature (e.g. in use with students); they would expect an informed consumer approach to be created at the time of using *SEA* by specialist guidance external to *SEA*.

It must also be accepted that the literature of the sociology of education is of academic interest to many without a sociological background (30 per cent of a College of Education group we studied were non-sociologists), to academic educationalists in general as well as specifically to sociologists of education. The problem here, as *SEA* sees it, is that the sociological perspective is lacking in the user, yet essential to an adequate understanding of the material—a problem similar to that constituted by educationalists such as school teachers and administrators who may hope to obtain from *SEA* guidance in dealing with practical problems. Such users are at a loss, if they lack a sociological background, in assessing the implications of the work of sociologists of education for the practical educational situation, i.e. what it represents in terms of information generalizeable outside its particular theoretical framework.

The main types of approaches to the literature may be analysed as follows:

	ACADEMIC STANDPOINT	
TYPE OF INFORMATION SOUGHT	*Theoretical*	*Pragmatic*
Sociological	1	2
Non-sociological	3	4

Given a diversity of user approach arising from difference of interest and background, there are two policies open to an information service—to seek the lowest common denominator or to focus upon a 'target' user group (*SEA* nominates group 1 above) whom others might be expected to emulate. The former policy may or may not be of some practical assistance to some users but is unlikely to provide quality service measured by any academic standards. The latter policy is preferred by *SEA* as more consistent with its aims, as the kind of service it can most usefully render to educational studies. In so far as additional user approaches can be met without detracting from the value of the service to the sociologist working in education, it is our hope to do so.

There is a reservation to be made with regard to practitioners. It will probably be generally agreed that practitioners (Group 4) are not on the whole interested in the literature *per se*; their need is basically for data for decision making of some kind, not for information about documents. Their academic interests, unless they are studying, say, for a higher degree in education, lie largely elsewhere (e.g. the geography teacher in geography) and for these interests other discipline services may serve them better. For the technical/educational aspects of their work, a 'tertiary' publication, in which preselected works are presented in predigested form, is probably more appropriate than a secondary publication such as an abstracting service. It is hoped in the later stages of our work to experiment, in a selected group, with such a publication.

Fragmentation of services is clearly, from all points of view, to be avoided as far as possible. At the same time one would not wish, merely for the sake of organizational neatness, even for the sake of economy, to overlook real differences in approach to the literature nor their implications for use of bibliographical services. Even given a 'target group', the *SEA* situation raises an important ethical issue for information service in the social sciences. The INFROSS study (report forthcoming) has revealed that there is greater use of bibliographical services amongst social scientists than has commonly been supposed. Nevertheless by any standards the potential is far from realized. A balance has to be struck between 'educating' the user in use of information services and developing information services to accord with his requirements and habits of information seeking. Specialists fear that, in fields which are to any degree literature based, such 'education' could represent interference in intellectual processes. However, to the extent that (1) we can identify the main types of problems which create a need for information, and the kinds of questions to which they give rise, and (2) appropriate types and formats of answers can be agreed by subject specialists whose judgment will be respected by their colleagues, *SEA* feels that an acceptable compromise can be reached.

Relevance

The range of literature of interest in the study of the sociology of education is as varied as the range of users. The problem of relevance is one that we have explored in some detail and it has become evident that no single criterion of relevance is acceptable, even given a focal group. Much 'relevant' material does not deal directly with the sociology of education. There may be no apparent relevance in terms of subject matter, i.e. it may be sociological writing other than that relating to an educational context. Or it may be non-sociological writing about education—raw data for the sociologist. There are clearly other factors such as language, degree of technicality, which should not be overlooked as determinants of relevance.

The problems for consistency in selection and treatment are enormous. In preparing guidelines for our abstractors we have distinguished between:

(1) Material in or on the sociology of education.

(2) Sociological writing other than that relating to an educational context: (a) dealing with contexts which impinge upon education in a material sense, e.g. family, community, occupations (cf. Rapoport, Rhona R.N. 'The dual-career family: a variant pattern and social change', *Human Relations,* 1969, **22**, 1, p. 3–30); (b) offering an analysis of research techniques, e.g. social mobility, authority, compliance, deprivation, alienation (cf. Blalock, H. M. 'Status incon-

sistency, social mobility, status integration and structural effects', *American Sociological Review,* 1967, 32, 3, p. 790–800); (c) employing methodology or developing theories in experimental work which may be applied in the sociological study of education, e.g. studies of industrial organizations (cf. the Hawthorne studies *and* Carey, Alex, 'The Hawthorne studies: a radical criticism', *American Sociological Review,* 1967, 32, 3, p. 403–16).

(3) Sociographic or educational data or description (raw material for the sociologist of education) including surveys and fact-finding research, together with descriptive accounts or 'analysis' of the social and educational scene. Such work is seen to offer a basis for sociological thinking about education, as distinct from material which is of more 'background interest', and from that which may offer ideas but requires supporting evidence before it may be 'used' by the sociologist of education. Personal impressions, prescriptions, general discursive writing, etc., to be found in both academic and less academic educational writing, would not normally be regarded as appropriate in *this* category, though might legitimately be included on other grounds.

(4) 'Social' (non-sociological) writing about education: discursive work essentially of background or general interest to the sociologist of education as sociologist, and as such representing a very wide potential range.

An important question for an information service is whether such disparate material can be uniformly regarded rather than treated from an author's eye view, in its own terms. *SEA*'s view is that it cannot. With regard to selection the listed categories have a diminishing order of priority. In terms of description there is at the least a fundamental difference between the 'subjects' of descriptive or discursive writing and those of theoretically based work. Any type of work may have a relevance for any user group other than that which it holds for the particular audience to which it was addressed, and different user groups may vary in assessment of nature as well as degree of relevance. For questions of detail therefore, as well as in general approach, *SEA* favours the identification of a target group.

The *SEA* approach to information processing

Probably most would agree in principle that the contents of representations of individual documents should reflect the unit of analysis of the writer. The distinctions to be made are, however, more subtle than is often realized. Compare the concepts of 'foreign birth' and 'foreign born people' in the following example:

> 'The logically clear fallacy of inference from an aggregate to the individual has been shown to hold in actual research when Robinson (1950) tested an hypothesis that since educational standards are lower for the foreign-born, there ought to be a positive ecological correlation between foreign birth and illiteracy. However, when the data for groups in census areas were analysed, a negative correlation was found to exist between the proportions of foreign-born and the proportions of illiterates. When, on the other hand, the data were analysed in terms of INDIVIDUALS, a positive correlation was found. The point is, of course, that the ecological characteristics of groups have no necessary connection with the relationships of these same characteristics in individuals'.[5]

It is less obvious that mode of conceptualization should be a significant factor in classification.* It may be argued that an empirical-world-oriented scheme is (a) most helpful to users, since this is what users are primarily interested in, irrespective of discipline affiliation, and (b) a more appropriate treatment of the literature, since documents deal with the same 'things' in the 'real world' of education though from different perspectives. These arguments have a particular appeal in a field such as the sociology of education in which 'practitioners take the knowledge and theories evolved by the pure scientists and apply them to the solution of practical problems'.[6]

The following counter-arguments may be put forward. In the first place, the primary interests of sociologists of education *qua* sociologists (*SEA*'s target group) lie in sociological problems though, additionally, it is hoped that sociological study will offer insights which may help to solve practical problems. Thus a scheme allowing for a discipline (e.g. sociology) approach rather than a mission or problem (e.g. education) approach is to be preferred by sociologists. Even from the point of view of the non-sociologist, bearing in mind the now familiar distinction between data and information, it could often be highly misleading to present, as 'information', sociological findings divorced from their conceptual context. Though superficially appearing to be helpful, it would in fact be the reverse, could be positively harmful and thus irresponsible, and could only bring a service following such a policy into eventual disrepute.

With regard to argument (b), let a sociologist (Smelser) reply:

> '.. sociological explanation has to be defined not as the relation between two different classes of things—theories and facts—but as a relation between *two conceptual frameworks*. It consists in comparing the linguistic and conceptual conventions by which we organise the phenomena that we call the empirical world with the linguistic and conceptual conventions by which we organise the phenomena that we call ideas. . . . This kind of conclusion is somewhat disturbing to those of us who like to think of a 'real world' that is separate from our ideas about it; but it is more in keeping with the ways in which experience is organised and scientific investigation proceeds'.[7]

Buckley also has a point relevant to the 'reality' argument:

> 'it becomes increasingly difficult for any discipline to claim that it is dealing with a "real entity" or "substance" while another's subject matter is an abstraction or mental construct. And should the practitioner of any discipline claim that the unit of focus on the next higher level must be explained basically in terms of *his* unit of analysis, then he must be prepared to give up his own autonomy in the face of the similar claims of the discipline just below him. The end point of such an argument, of course, is the not very helpful evaporation of everyone's unit of analysis into a swirl of electromagnetic fields and nuclear forces'.[8]

If then the 'empirical world' view is merely one amongst a number of conceptual frameworks, just one unit of analysis, this offers no common ground. We have instead only alternative sets of abstractions none of which is any more 'real' than any other.

It is *SEA's* contention that a scheme adopted for the processing of information for sociologists should be sociologically meaningful. But sociology has no single theoretical model; there are a number, each focusing upon some part of the total pattern of social interaction. Inkeles suggests that it is only by focusing upon certain aspects of the pattern (selective perception) that it is possible to begin to understand the mechanisms that operate.[9] Social systems by definition 'denote patterns of interhuman behaviour which are interdependent in such a way that any change in one pattern is attended by changes in the others',[10] and social situations are compounded often of a large number of variables amongst which the inter-relationships are complex.

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* The term is used in its broadest sense to comprehend not only schemes for systematic ordering of sets of documents or their surrogates but also structuring of cross references in an alphabetical subject index and 'models' establishing preferred practices of preferred order in structuring individual subject statements and classifying individual documents.

The sociologist is heavily dependent upon models for the purposes of theory building and, since validation by experiment is not easy when it is concerned with human beings, models tend to become rallying grounds for competing schools of sociology—hardly a suitable climate for effective bibliographical classification.

Smelser predicts that the current overlapping frameworks will 'give way to more general characterizations of structures and processes' and 'will probably evolve to fewer, more analytic areas', but greater theoretical sophistication can only be a gradual process, as the discipline develops.[11] In the meantime an information service has a responsibility not to support any premature crystallization in thinking which may be called for in the name of user convenience—a myth in the context of this discussion.[12]

It is against this background that the major classification schemes and indexing systems have been studied and our experience to date is that none of the empirical, theoretical or linguistic algorithms or models presently used are, as they stand, wholly or consistently appropriate (for different reasons) to our material (this experience is set down in detail in a recently issued report[13]). Thus, for instance, established principles of preferred order tend to lead to inappropriate groupings of documents, or simply cannot be applied at all, since the available categories do not fit the structure of thinking in sociology. This is not to imply that classification in any of its manifestations is undesirable but rather to suggest that we must seek an appropriate basis for classification, conceptually neutral ground (which will not lead to the presentation of any material within an alien framework, thus distorting it) but nevertheless meaningful to the sociologist.

It will be necessary to make further study of enquiry (intellectual enquiry) patterns and the kinds of retrieval they appear to legitimize. Most of the existing systems have tended to be based on experience in science fields, different though the 'philosophies' on which the different systems rest may be. An IR system has probably to be viewed differently in a social science field, though it is possible that a developing interdisciplinary science area has many problems in common with ours.

'Retrieval', however, is a term which has become somewhat blunted through use. It is contrasted with 'browsing' as 'searching' or 'retrospective searching'. A distinction is often drawn between 'generic' and 'specific' searches. These are clearly valid ways of characterizing search patterns but are probably not the most meaningful in relation to our field. We are at present less clear about the patterns of use to be supported by our index than about those in use of abstracts, of which *SEA* has some experience, and once again it would be unwise to make assumptions. However, it is our impression that at least equally frequent amongst our target group is what might be called the process of 'formulation' in which the purpose can be clearly specified but perhaps only the required *type* of answer can be predicted, not the precise information required. For instance, reference to material, often of *indirect* relevance, is sometimes crucial as an aid to crystallizing research plans, formulating theories. This is a purposeful not a browsing activity. In a developing field much of the work is at the 'cutting edge'. Relevance is perceived when seen; this is a process more of stimulus-response than, as retrieval is often described, of matching something in the user's mind, whether it can be clearly expressed or not, with something that the indexer, even a sociologist indexer, can at present predict as being a useful 'handle' or part of the handle by which a document can be 'retrieved'.

With a greater understanding of such types of enquiry it may be possible to find ways, conventional or unconventional, now or in the future, of assisting them. Failure to do so where the approach is legitimate on intellectual grounds must be attributed not to inadequacy on the part of the user but to shortcomings in the service, and should help to shape the long-term goals of the service.

SEA in relation to other services

The *SEA* approach raises questions of general organization and co-operation amongst services. There was until a short while ago a general tendency to assume, in the interests of non-fragmentation, that there would be an eventual merging of specialist services such as *SEA* in some more comprehensive service to education. There appears now to be a leaning towards the view that a more appropriate form of service is a network of independent but co-operating specialist services, including perhaps a teaching/educational technology service.

In a recent report a Working Party of the Council of Europe recommends a decentralized system (EUDISED) in which national centres are responsible for the literature of their own country, contributing to a decentralized computer-based 'shared European and international system'.[14] The effectiveness of the system is seen to depend upon 'rules commonly adopted and observed'. A network of specialized centres with national co-ordinating centres, language area co-ordination and 'chains' of specialist co-operation is outlined. A 3-phase development plan is suggested.

The working party notes three major trends: 'a further diversification of subject fields, increase in interdisciplinary fields, and an increase in the need for problem-oriented information'. It seems that in general organization would be around 'specialist subject fields', on the lines of the ERIC clearing houses in the United States and set in a general social science framework, rather than a narrow and specifically educational one.

It is unarguable that co-ordination, integrated thesauri, a general classification, etc., are in principle ultimately desirable for the purposes of communication and dissemination of information both within and across groups concerned in different ways with the study of education. However, in our work we have been brought hard up against the realization that the 'specialist' principle offers merely organizational guidance in the problems of information processing and dissemination in education. It begs, even accentuates, the intellectual problems.

To the extent that services in these fields are concerned to support sociological, psychological, etc. study of the kind which will promote informed thinking about education, so selection criteria, treatment and intellectual organization for retrieval for 'specialists' may differ considerably.

It is clear that the Council of Europe's report is a general policy statement and that studies of the literature and of use of the literature will also be taken into account before any recommendations are implemented. We hope that our project may make a modest contribution to thinking on these matters. At the very least it has served perhaps to stress the desirability of re-examining some of our assumptions and to indicate the need for a partnership between subject specialists and information scientists—to attack the problems from the inside.

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TECHNICAL TRANSLATIONS: MEETING THE NEED

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'The telling of this story' wrote Gottfried Keller at the start of his *Romeo und Julia auf dem Dorfe*, 'might seem to be merely pointless repetition.' The writer of yet another paper on technical translations may feel himself in the same position. What can he say that has not already been said? Faced with this problem, I first thought to solve it by describing my own experiences in this field, since one of my functions as an information officer is to operate a translation service. I am therefore inviting you to follow the progress of a typical translation through our system at BP Research Centre from the initial request to the final evaluation. However, to prevent this talk from being too parochial, I shall try to relate each stage of the process to the wider issues involved.

Stage 1: The initial request

The initial request for a translation may be made in many ways, from a tentative enquiry to a formal request. But whatever form it takes, one thing should be remembered: with a technical translation, as with any other form of enquiry, it is at this stage that a detailed discussion with the requestor can save a great deal of wasted effort and money. Where did he obtain this reference? For what purpose does he need the translation? Has he seen an adequate English abstract of the article? For that matter, has he seen the original article at all? Does he really need the entire article to be translated, or will a partial translation suffice? How urgently is the translation required? The answers to these and similar questions will give us a clearer idea of the requestor's real needs, and will help us to answer the unspoken question that lies behind many of the previous questions: does he really need a translation at all? I myself find that I receive remarkably few frivolous or ill-considered requests, possibly for a reason which we shall be discussing later. Quite often the requestor has seen an English abstract, and many of the requests can be traced back to the abstracts bulletins circulated by our Technical Information group. However, it is also quite common for a requestor to be interested only in certain sections or topics, and it is only these parts which really need to be translated.

Another point to be settled at this stage is the degree of confidentiality of the material to be translated. In the case of published material this problem rarely arises, but it can be a serious difficulty for internal company reports and similar items. In extreme cases it may not be possible to send the translation to an outside translator at all. Less confidential material can be sent out, but it should go to a translator who has proved to be trustworthy and the nature of the contents should be made very clear to him. A written confidentiality agreement is a good safeguard here.

One problem which rarely arises is the determination of the language in which the original is written. However, if such problems do arise I generally make use of a very helpful article by Clouser and Skolnik[1], which enables a quick identification to be made of any of the 38 languages important to chemical research.

Stage 2: Checking availability

Once I have established that there is a genuine need for a translation, my next job is to try to avoid having one made. In other words, I carry out a careful check to see whether a translation of the article is already available. The obvious approach is to consult the Aslib Commonwealth Index of Unpublished Translations, and this, of course, I do, but it is not my first approach; it is in fact my third. My first approach is to check our own library holdings. This has been a firm rule ever since the day I phoned Aslib to see whether a given article had been translated, and after consulting their records they replied 'Yes, it has—and you hold the translation!' Apart from saving such embarrassments, a check of our own holdings shows whether we have a similar article by the same author in English; this is one case where multiple publication can be a blessing rather than a curse. A further check which is made before phoning Aslib is to see whether the article comes from a journal which is available in cover-to-cover translation. The best way to check this is to consult Himmelsbach and Boyd,[2] which not only gives information on whether a given journal is translated, but also the time lag between the publication of the original and the publication of the translation.

At this point I shall digress for a moment to consider the wider aspects of the provision of cover-to-cover translations. At present, 200–300 foreign journals are regularly translated; generally the entire journal is covered, though in certain cases (e.g. *Petroleum Chemistry USSR*, the English version of the Russian *Neftekhimiya*) only selected articles are translated. Most but not all of these journals are Russian. Two questions might be asked here: firstly, whether the provision of such translated journals is not the answer to the translation problem, and secondly, whether this service should not be extended to cover some of the other major scientific languages, e.g. German and possibly Japanese. An Aslib study on the first question was reported by Hanson[3] in 1962.

Requests for translations from a given journal (as indicated by entries in the Commonwealth Index) before and after a cover-to-cover translation became available were compared. In almost 50 per cent of the cases considered the number of translations requested was the same or even higher after the appearance of the cover-to-cover translation. The most probable reason for this is the time lag between the publication of the original and the publication of the translation. Hanson in 1962 recorded time lags ranging from four to thirty-nine months, with a high proportion of journals having lags of from seven to twelve months. Himmelsbach and Boyd[2] in 1968 show a somewhat wider range (two weeks to three years) but the average remains the same. Now if a scientist requires a translation because it is of immediate relevance to his current work, he is not at all interested to learn that a translation will be available in six to twelve months' time; he wants it now, even though it means paying the full translation price for something which will be available at a considerably lower price later on. Thus the usefulness of cover-to-cover translations, as far as meeting the need for individual translations is concerned, is limited to two cases: the case where the translation is only required for background reading or general interest, and the case where the article is old enough to be already available in a cover-to-cover translation. Within these limitations, cover-to-cover translations can be of considerable use, but in general terms they cannot be considered the final answer to the translation problem. This assessment of course affects our answer to the second question. In addition, as Tybulewicz[4] has recently noted, there is less of a case for translating German journals cover-to-cover because more English-speaking scientists can read German than can read Russian, and, in the case of Japanese, much of the work of interest is published in English in any case. Admittedly Foo-Kune[5] has recently noted that the proportion of European language content in Japanese technical journals is in fact decreasing by 2.2 per cent per annum, but the validity of his figures has been challenged.

To return to our translation, I have now checked its availability in our own holdings, as part of a cover-to-cover translation, and with the Aslib Commonwealth Index. Further checks will depend on the subject of the article. Articles on chemical topics are checked with my colleague at the BP Chemicals Limited Research Centre at Epsom and articles on certain other topics are checked with the appropriate research association (e.g. articles on engines can be checked with the Motor Industry Research Association at Nuneaton). Generally speaking, however, most of our successful checks have been made with the first three sources named.

Stage 3: Costing and commissioning the translation

On this particular occasion we will assume that all attempts to find an existing translation have failed. A translation must therefore be made, either by a member of the Research Centre staff or by an outside translator. The former alternative has a number of advantages (familiarity with subject matter, no problems with confidentiality) and the Research Centre staff can cover a fairly wide range of languages. Unfortunately for our purposes, however, they are usually fully occupied with their own work, and therefore, unless there are exceptional circumstances (e.g. highly confidential material), the translation will be sent to an outside translator. Before selecting the translator, I make a word count of the article and estimate the probable cost. I then pass this information on to the requestor and ask him if he is prepared to accept this cost. This is the point at which any frivolous or ill-considered requests are abruptly cancelled! However, the requestor may have a genuine interest in and need for the translation, but still feel that the price is more than he is prepared to pay. In such a case I usually go through the article with him (if this was not done when the initial request was made), find which sections are particularly relevant to his interests, and cost these separately. It may also be that the requestor is not really interested in the article as a whole, but only in certain specific topics. For a short article I myself may be able to skim quickly through it and give him the information he needs.

If this is not practicable, at least one translation agency will provide a translation of selected topics from an article, charging only for those parts translated. This can give a dramatic reduction in costs; for example, one article which was estimated at £42 for a complete translation actually cost £5 12*s* when translated by this method, and the requestor still obtained the information he required.

We now come to the actual commissioning of the translation. There are basically three sources that can be considered:

(i) Freelance translators
(ii) Translation agencies
(iii) Special sources

The main advantage of *freelance translators* is that they are generally cheaper than the agencies; they may also be quicker. On the other hand, the presentation is often not so good (a skilled translator may not be a skilled typist) and the translation is not checked (except, one hopes, by the translator himself!). It is also advisable to phone the translator before sending the translation to make sure that he is not ill, on holiday, at a different address, or already overloaded with work. Again, care must be taken to select a translator with the right combination of language and subject knowledge. These disadvantages should not occur when an agency is used, for a reasonable-sized *agency* should have enough translators on its books to be able to provide translations from any language on any scientific subject at any time. The presentation of the finished job should also be better; it should be neatly typed, clearly set out, and, if possible, the figures and tables should be photocopied and inserted in their appropriate places in the text. On the other hand the cost will, of course, be higher and the time taken will be longer.

Under the heading '*Special sources*' I would include the research associations, some of whom will provide translations at low rates for their members. We should also not forget that the NLL will produce free translations of Russian documents, provided that the requestor is prepared to check the rough draft.

Information on translators and translation agencies may be obtained from a number of sources. For some years Aslib has maintained a register of translators indexed both by language and by subject, and has advised its members on possible translators for given language-subject combinations. Recently Millard has published a directory of translators[6] which is based largely on the Aslib register and can be used in the same way. Other information may come by personal recommendations or by advertising leaflets sent by the agencies. I make it a policy to try out any promising new translator or translation agency that comes to my notice, and over the years I have been able to build up a number of useful sources.

Selecting translators at random from a directory is rather like trying to pick Derby winners with a pin—a chancy business at best, and a complete waste of money if your luck is out. In both cases, it helps to have some basic criteria to go on. My own criteria for choosing translators are:

1. The range of subjects which they claim to cover should be neither too broad nor too narrow. I am frankly suspicious of the man who offers his services in all subjects from astronomy to zoology; at the same time, a man with

too narrow a subject field may be in difficulties if the article to be translated includes material outside his field. I well remember one translation where I had chosen a translator whose subject knowledge matched the precise and somewhat specialized field of the article. In this field he was indeed an expert, but unfortunately the article also included some fairly elementary chemistry, and here he ran into serious difficulties. Among other things, he appeared unable to distinguish between hydrochloric acid and hydrocyanic acid!

2. I prefer the translator to live within fairly easy access. This is a personal foible, but if anything should go wrong I do not want to have to add to the cost of the translation by making trunk calls to Aberdeen!

3. Lastly and most important, the translator should be translating *into* his own language.

This is a good place to consider the general problems of cost and quality of translations. The two factors are related, but unfortunately the relationship is not a very direct one. As Finlay[7] remarks, poor translations always cost too much, but good translations can also cost too much. The standard rates recommended by the Institute of Linguists may be used as a guide, but not all translators keep to them.

Translators charging very low rates are usually suspect; Gingold[8] states that they are unlikely to provide service of acceptable quality, and adds that, since the scientist's time is usually far more highly paid than that of the translator, it is false economy to save money on a translation if the customer has to waste valuable time reading and re-reading it in order to get any meaning out of it at all. Obviously it is impossible to give a definite rule, but as a general working principle I would advise against using any source which charged more than £2 per 1,000 words *below* the Institute of Linguists recommended rates, e.g. less than £5 per 1,000 for German or less than £8 per 1,000 for Russian. Conversely, I would expect extremely good service before I would consider paying more than £1 per 1,000 *over* the Institute of Linguists recommended rates.

The customer, who after all is paying for the job, may find even these rates excessive, and may ask why translations have to cost so much. This complaint may seem annoying to the translator but is in fact flattering, since it assumes that the translator not only has an absolute and perfect knowledge both of the language and the subject concerned, but also that he can deal with misprints, new terms, ambiguities, and downright bad writing with the very minimum of effort. In real life the translator, however skilled he may be, is only human, and a translation which appears straightforward may in fact require a great deal of time and intellectual effort to complete. It is not always possible to explain this to the customer, unfortunately. I remember one customer who, on being told that a 3,000 word German technical article would cost more than £1 to translate, flew into a rage, declared that all translators were swindlers, and announced his intention of translating the article himself, since he 'knew a little German and could use a dictionary'. I was quite happy with this arrangement, and asked if I might see a copy of the translation when it was done. Strange as it may seem I never saw that translation, but when some time later I mentioned the subject of translations again I found him far more reasonable on the subject of costs!

One last point should be mentioned before we leave the subject of commissioning translations. The translator must be given as clear and complete a copy of the original as possible, including all tables, graphs, figures, and (perhaps most important) the list of references at the end. Many a difficult problem in terminology can be resolved by consulting an English-language reference in the same field.

Stage 4: Checking the translation

The article has now been sent to the translator. After a certain period of time, I shall receive the finished translation. The actual time taken will depend both on the translator and on the nature of the work to be translated; on the average it is about one to two weeks.

It might be thought that my work is now over, apart from dispatching the translation to the requestor. However, one important job still remains to be done; the translation must be checked.

How does one check a translation? Obviously, if one knows the language oneself it is possible to translate the original sentence by sentence, comparing it with the translation given. But this is a very laborious process, and should only be used in exceptional cases. Generally speaking, the simplest method is to read the translation through and see whether it makes sense, and whether it is free from clumsy and un-English constructions. For example, one translation which I received appeared suspect, and my suspicions were confirmed when I found the following sentence: 'In our country we enjoy rivers mainly of the mountain kind, with a relatively high water content'! In a case like this the translation should be returned to the translator with a complaint, but in less serious cases it is possible to make the necessary minor amendments oneself before passing the translation to the requestor. Van Haagen[9] has compiled a useful list of common mistranslations and their English equivalents which can be helpful here. Of course, the amount of time spent on checking depends on how well I know the translator; in the case of our regular translators, it is reduced to the very minimum.

Finally the translation is passed to the original requestor with a form asking for his evaluation of the translation. Very few unfavourable answers are obtained; an analysis of the forms returned over a two-year period shows that 85 per cent of the requestors thought the translation quality was good, 11.5 per cent thought it was moderate, and only 3.5 per cent thought it was bad. This may reflect less on my success in commissioning and editing translations and more on the traditional British dislike of complaining, and also on what might be called the 'be kind to the translator' attitude. As one of our staff remarked on handing me a translation prepared by one of his colleagues: 'It's really not at all bad, considering that it had to be translated from Italian'! However, the forms do at least allow the requestor to point out any errors in the translation, and when this is done the corrections are made to the copy of the translation which is deposited in our Library.

The foreign language problem—some possible solutions

I have now described the particular methods which I use to obtain translations.

I certainly do not claim that this is the best way to tackle the foreign language problem (although it works for us) and in this final section I should like to consider some other approaches to this problem, and also whether there is a problem at all.

One solution which at first sight appears very attractive is the use of a *universal language*, i.e. a language comprehensible to scientists of any nationality. This language might be an existing language (e.g. English) or an artificial language (e.g. Esperanto, Interlingua). All scientific material would be published in this language and, since all scientists would be taught to read and write the language, the need for translations would be completely eliminated. The proposal is certainly attractive, and the only real objection is that there is at present no universal language, nor any language likely to be accepted as one. I am not proposing to discuss the pros and cons of the various candidates; anyone interested should consult the Unesco report on scientific and technical translating[10], where they are discussed in some detail. Of the artificial languages, Esperanto and Interlingua in particular have strong claims, and both have been used in scientific work (there is, for example, *Scienca Revuo*, a quarterly review published in Esperanto). Nevertheless it is only fair to point out that although Esperanto was founded in 1887 and Interlingua in 1940, their use in the scientific literature is still insignificant; indeed, I cannot at present recall any major scientific periodical that even includes abstracts in either of these languages, let alone articles.

In an ideal world, we might all speak the same language. In the real world, with its diversity of languages, might not the answer be *to teach scientists foreign languages*? There are, after all, only a limited number of languages used in science, and if scientists could be given a working knowledge of these languages they would be able to read articles of interest in the original without the need for a translation. There is nothing basically impossible in this suggestion. Certainly the section of Hanson's report[3] which refers to language training is promising. Of 40 students who had received 45 hours of tuition in Russian, 29 were able to make sense of a Russian paper, while another 65 students who had received 180 hours or more of tuition could all do this. It is also true that there is no shortage of means for language learning. A basic knowledge of any of the major languages can be gained from books, gramophone records, courses, and language tuition programmes on the radio and television, and there are also books and courses intended specifically for scientists. Nevertheless, the demand for technical translations remains as high as ever. What are the reasons for this? Firstly, a good scientist is not necessarily a good linguist, and while the old legend about the British inability to learn foreign languages is rapidly losing ground it still retains enough force to discourage many scientists from even trying to learn a language. The scientists referred to in Hanson's report were those who were sufficiently interested to enrol for a course and keep with it for the whole time; as Hanson admits, they are thus not a representative sample. Secondly, scientists have only a limited amount of time for reading material of interest, and unless they have a reasonable fluency in the language it may take a disproportionate amount of time for them to read foreign language material. All things considered, language training for scientists is certainly to be encouraged, but at best it can only alleviate the problem; at worst it may indeed aggravate it, by drawing the scientist's attention to more material of potential interest which he feels incapable of translating fully himself.

We therefore come to the final suggested solution—*machine translation*. Here we find a sharp division into the professional translators (e.g. Gode[11] and Sinclair[12]) who refuse to believe that the subject is worth serious consideration, and the computer specialists and theoretical linguists (e.g. Booth[13] and Dostert[17]) who can see no insuperable difficulties to the problem. Neither side appears to acknowledge the other side's viewpoint, which to me seems a pity, since I do not think that machine translation should be condemned without at least considering the arguments for and against it. The crucial points are:

1. *Speed*

The computer is undoubtably faster than a human being when it is actually computing. However, the business of getting the raw data into the computer and sorting out any difficulties that arise is lengthy and time-consuming. Admittedly, recent developments in data input (optical character recognition, computer-controlled data preparation) may simplify the process, but the nature of our input is such that it will be some time before this will be of much use to us.

2. *Post-editing*

Opponents of machine translation make a lot of play with the fact that the translation produced is almost unusable until it has been edited by a human translator. What they forget is that the translation produced by a human translator generally needs editing, either by the translator himself, the agency which employs him, or the customer. However, there is an important difference; the checking of the output from a competent human translator should not require much time, but it is claimed[14] that the time taken to post-edit a machine translation is as great as the time needed to make the translation from scratch. Certainly the report by the US National Academy of Sciences and the National Research Council[15] found that post-edited translations took slightly longer to do and were more expensive than conventional human translations. On the other hand, we must remember that the need for post-editing of machine translations may not always be with us. For example, post-editing was not used in the National Physical Laboratory project, and yet Szanser[16] reports that the majority of the scientists asked to evaluate the translations found them acceptable.

3. *Quality of Output*

This is the crux of the matter. The computer can perform a straightforward word-for-word translation simply, quickly, cheaply, and with the minimum of effort on anybody's part; the only trouble is that the resulting translation is practically uselsss. Most of the immense amount of work that has gone into machine translation research has been devoted to improving the quality of the output. Has it yet reached the required level? More important, what level should it reach or, to widen the question, what standard of quality do we expect from a translation? The simple answer is that the scientist should be able to read the translation as easily as if it had been written in English in the first place. Dostert[17], however, contests this as an immediate standard for machine translations, and provocatively asks: 'Isn't this in fact requiring of the machine more than is generally performed by human translators?' He agrees with Ida Rhodes[18] that the essential thing is reliability of information transfer; a translation is practical if it enables a scientist to reproduce an experiment described in a source paper and to obtain the same results. As Dostert shows, this standard can be reached at present, even without post-editing. But is this really enough? Here we come back to Gingold's[8] point that the scientist's time is valuable, and that it is false economy to make him use it unnecessarily. Unless he can read the translation quickly and with the certainty that he has grasped the full meaning, we are not really saving time or money at all; we are merely shifting the burden from the translator to the scientist, which is a false economy.

To summarize, we may say that machine translation has advanced considerably since its early 'invisible idiot' days. However, comparative tests[15, 21] have shown that there is no need for the human translator either to despise or to fear his machine counterpart. The latter can certainly make a useful contribution, possibly by indicating the material that would merit full human translation, but it will not in the foreseeable future be in any sense a rival.

We have considered several possible solutions to the problem of the foreign language barrier. But is there really a problem at all? Is the term 'The Foreign Language Barrier' not just another expression like 'The Information Explosion' and 'The Generation Gap', a striking phrase which has magnified a minor problem into a major one? On the one hand we have Wood[19] stating that 'the language problem is of considerable magnitude and is common to the majority of scientists and technologists', and on the other hand we have Savory[20], writing in the same year, commenting: 'There are plenty of obstacles to scientific research, but the problem of language is not, as a rule, the most formidable.' Beyer[14] makes a good case for the fact that English has now become the established language of physics, but Hanson[3], while acknowledging the widespread use of English, warns that this does not justify the assumption that the literature which is not in English is of no value. Where does this leave us? I am sure that with the application of a little logic and ingenuity it would be possible to argue that the foreign language barrier does not exist, just as a group of aerodynamicists were once able to prove, by rigorous scientific calculation, that the bumble bee could not possibly get off the ground, let alone fly. Unfortunately no-one was able to communicate this result to the bumble bee, with the result that the silly creature just went on flying as before. Similarly, I am afraid that, no matter how firmly we prove the non-existence of the foreign language barrier, requests for translations will continue to pour in. I do not pretend that there is any simple answer to the problem, but I feel that a greater degree of understanding between the translator and his client will help. It is my hope that this paper, given before this audience, may have helped to promote this understanding.

Acknowledgement

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DISCUSSION

MR V. BISKE (Burmah Oil Trading Ltd) said that, as regards notification of translations to Aslib, and other registers, this was surely a matter for the person who had commissioned the translation and not for the translator; it was not for the latter to decide whether the translation (which was the property of his client) was to be made available to others.

MRS S. GAHAGAN (British Aluminium Co. Ltd) said that in order to assess real needs and to keep translation activity on a satisfactory economical level, it was absolutely necessary to have a highly competent information officer/service, capable of avoiding duplication, plus co-operation between requestor and translator to establish the necessity and extent of the translation required. Unlike machine translation, where quantity pays for the exercise, translations involving a human translator should be characterized by maximum intelligent selectivity.

MRS H. DAVOLL (Milk Marketing Board) said that, with regard to ascertaining the real need of the requestor for full translation, the wording of the title of the paper in a translated index, or perhaps the addition of a few extra words indicating coverage of the paper, could often show that full translation would not be of much use.

MR W. R. STOKER (Freelance translator) asked MR SCOTT how the vetting time and cost compared with the translation time and cost. MR SCOTT replied that there were no actual figures available, but he was certain the former was much less than the latter.

MR D. BALL (Reed Group) asked MR SCOTT three questions: (a) whether he had examined the economics (as against certain extra advantages) of the in-plant translator as against commissioning, (b) whether, by notification of a translation of an index (to Aslib, RA's etc), we were not giving away property of commercial value, sometimes encouraging firms not to contribute to a common pool, and avoiding employing information officers and translators; and (c) whether industry-based translation exchange schemes would make better commercial sense. In reply to question (a) MR SCOTT said that an informal survey had been carried out a few years ago, when it had appeared that an in-house translator would not have been economically justified. However, conditions change, and it might be necessary to revise this opinion in the future, to question (b) that he did not think this was a serious danger; and to (c) that this suggestion was certainly attractive, but presupposed the existence of some central body able and willing to organize such a scheme.

MR A. O. MELLING (CEGB) said that checking for existing translations was not costly. At the CEGB this was done as routine by a clerical assistant. MR MELLING also said that oral or 'face-to-face' translations were not a waste of time. Whether the result was a full translation or only a part translated for the engineer or scientist, his organization tried to arrange for a tape recorder to be running and then for the transcript to be made available.*

MR N. NEWMAN asked MR SCOTT from what languages did BP get requests for translations. MR SCOTT replied that these requests, in descending order of frequency, were from German, Russian, French and Italian.

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* With regard to a further question from MR MELLING concerning the problem of copyright which may subsist in the original article, MR SCOTT has submitted to the editor, since the meeting took place, a reference to the report of a talk given by Mr G. D. Astley, Secretary of the Translators Association, published in the Summer 1970 issue of the Aslib *Technical Translation Group Bulletin* (p. 44–5). Mr Scott feels that the following statement from the report may help to clarify the situation regarding copyright in the translations field:

'The owner of copyright in the document translated also has rights in respect of the publishing of the translation, but has no control over the actual making of the translation and its use on a "fair dealing" basis within the translator's own organization. Any public distribution would, however, require the permission of the original copyright owner. (This would not apply to documents originating in countries such as the USSR or the German Democratic Republic, which have not as yet adhered to any international copyright convention.)'

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Analyses of information-seeking, literature-use and library-use patterns; user training.

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Flow and organization of knowledge, including national policies; information theory

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Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

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Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

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Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

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Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

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Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

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*Items are available in the Aslib library and may be borrowed unless marked * to indicate reference copies.*

User Studies

RZASA, PHILIP V. *and* MORIARTY, JOHN H.
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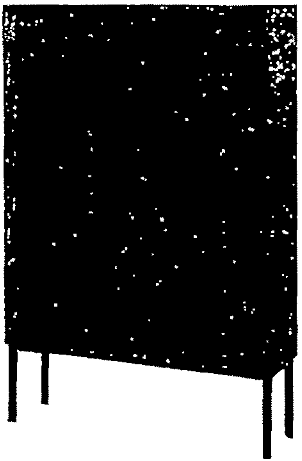

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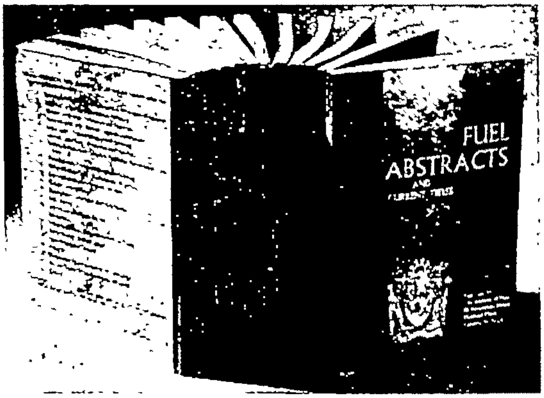

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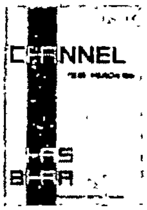

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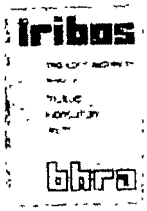

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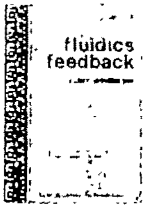

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Some problems of using an unstructured information retrieval language in a co-ordinate indexing system A. G. A. PICKFORD 133

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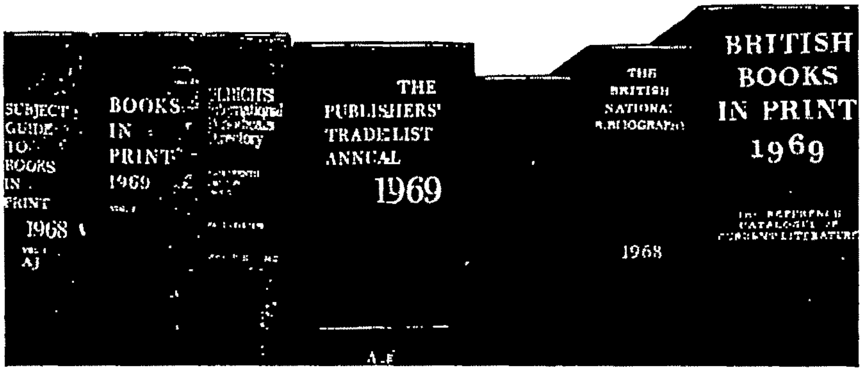
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ASLIB CALENDAR 1971

March

MON.29–WED.31.	Transport Group Course: 'Effective library management'. Missenden Abbey, Bucks.
WED.31–FRI.2.	Chemical Group Conference: 'Infochem' 70s'. University of Surrey, Guildford.

April

MON. 5.	Transport Group Annual General Meeting, sherry party and evening lecture. Aslib. 5 p.m.
THU.15.	Social Sciences Group meeting and lecture, by Dr N. Bradburn (Director of National Opinion Research Centre, USA). Aslib. 5.30 p.m.
THU.15–FRI.16.	Co-ordinate Indexing Group Annual Conference: 'Thesauri: construction, development and evaluation'. University of Surrey, Guildford.
FRI.16.	Textile Group Annual General Meeting. Aslib. 11.30 p.m. Engineering Group Annual General Meeting and evening lecture. Aslib.
MON.19–WED.21.	Chemical Group course: 'The nature and language of chemistry'. Courland Grove Hall, Wandsworth.
WED.21.	Aslib Evening Meeting. 'Controlled circulation journals', by R. J. Findlay and W. Streatfeild (Morgan-Grampian Ltd). Imperial College, London. 5 for 5.30 p.m. Chemical Group Annual General Meeting and lecture: 'A Canadian's view of the UK Information Scene', by Dr F. W. Matthews (ICI). Rembrandt Hotel, London. 11.30 a.m.
THU.29–SAT.1.	Midlands/Northern Branch Joint Conference. Royal Cambridge Hotel, Cambridge.

May

THU.13.	Aslib visit to NRLSI, Bayswater Division, London W2. 4.30 p.m.
FRI.14.	Biological Group visit to Biodeterioration Centre, Aston, Birmingham.
WED.19.	Aslib Evening Meeting. 'Mass Observation Archive at Sussex University', by Mr Tom Harrison. Imperial College, London. 5 for 5.30 p.m.

June

WED.9.	Aslib Annual General Meeting. Aslib. 5th Aslib Annual Lecture. 'Words and documents', by Dr H. Coblans. Senate House, London University. 6 p.m.

Aslib research and development during 1970

A more formal account of this activity, mentioning all the projects undertaken, will be included in the annual report of Council, the *Work of Aslib* for 1970. Three themes are selected for note here.

One project has concentrated on the information needs of users: more specifically, what do chemists need by way of quantitative data? Interviews with five hundred chemists were carried out at the respondent's place of employment (industrial organization, government department or university). Areas covered by the interview schedule included: the respondent's personal definition of the word 'data'—i.e. what he thought belonged under that heading; type of data produced and used; data sources; difficulties with data.

The majority of chemists interviewed produce *and* use data. The most usual way of organizing and preserving their own data was to incorporate it in an internal report. Tables were preferred to graphs as a presentation method. External publication of their own data was achieved by a quarter of the participating chemists. The percentage varied in the different employer groups, and was, understandably, notably lower in industry. The major data source was the published literature. Only 15 per cent used other people as data sources, although nearly a half approached other relevant organizations fairly formally in search of data. The need for critically evaluated data was explored and produced a split result. 'Unnecessary' was the answer given by 33 per cent of chemists, 43 per cent said it was necessary or important, and the rest thought it helpful rather than strictly necessary, or sometimes (but not invariably) necessary.

In addition to the interview, chemists were asked to complete record sheets for each item of data sought on the next working day after the interview. The average number of items needed by those who habitually use data (as opposed to just producing it) was 1.7 per day. Data enquiries put to libraries are being analysed as part of the study. Results here have been disappointing, in the sense that few libraries seem to have kept this kind of record for a sufficient length of time to provide usable material.

A second research theme to be mentioned was concerned with the provision of service to users: more specifically, what is the relative performance of different ways of providing current awareness in a large research establishment? Aslib has co-operated with information staff at the Atomic Energy Research Establishment, Harwell, in comparing notifications of current literature issued (a) by visually scanning new accessions, (b) by computer matching of user profiles against keywords on *Nuclear Science Abstracts* tapes, and (c) by similar matching against title words. The relative timeliness, yield, precision and recall of each service were established, and the reasons for failures to notify were analysed in detail. The results will shortly be published.

Other studies of current awareness service have been made. For the House of Commons Library, following their experimental computer-based service developed in co-operation with the Culham Laboratory, Aslib has been exploring the feasibility of using a computer in both current awareness and reference search. This has involved a detailed analysis of input and printout methods, and careful costing. Computer aid in the production of the *Zoological Record* has also been examined.

The third theme to be noted here was concerned with efficiency: more specifically, what does information service cost? Aslib has undertaken a number of projects involving different approaches to the problem of costing.

Some projects required the assessment of the total cost of providing a service (as it exists at the moment). The cost of producing subject indexes in the House of Commons Library was assessed in terms of the time spent by members of the staff on the various component activities. The overall cost of the Regional Bureau system for interlibrary loans has been assessed in terms of (a) the cost of running the Bureaux themselves, and (b) the unit costs to member libraries of making out requests and providing loans (staff time, postage, overheads).

At the other extreme, a long-term project has been started, the aim of which is to arrive at the standard costs of certain library and information procedures. The procedures are broken down into standard, small units of work, and the times taken to perform these units are measured in operational situations. In order to arrive at 'standards', an attempt is made to assess the effect of various factors on the time taken, and to explain the variations in time taken in terms of these factors. The performance times have up to now been collected in the form of a diary, filled in by individuals as they work; other techniques will probably be used in the future to overcome some of the difficulties encountered. The main use of these standard costs will be in system design, to help in the prediction of the possible running costs of any proposed system.

As can be seen, all the projects described have brought the Research and Development Department into direct contact with the operating libraries and information centres of Aslib members, and with their users. This integration of 'Research and Development' with practical situations is a major preoccupation of the Department, and further co-operation of this kind is to be sought in future work.

B. C. VICKERY
Assistant Director (Research)

Aslib 45th Annual Conference

The advance programme of Aslib's 45th Annual Conference accompanies this issue of *Aslib Proceedings*. A preliminary notice has already been distributed to members, and this amplifies the details of the programme of sessions and visits, describes the various arrangements for delegates' accommodation and travel, and includes registration, accommodation and travel booking forms.

Although 1971 is not an easy year, nationally or for many Aslib members, it is a momentous and challenging one. With the strong possibility that Britain will join the Common Market in the next year or two, the opportunity to hold the Annual Conference in Darmstadt, West Germany, was too good to miss, placing members in the forefront of those who are looking outward to a wider, international field of endeavour and communication.

Contributors to a programme that is consonant with this international opportunity are drawn from West Germany, France, Berlin, Austria and the USA, as well as the United Kingdom. They will try, in their papers, to identify and forestall the communication problems in the broadest sense that are likely to emerge in the next decade. With the generous and practical help of the Institut für Dokumentationswesen, a varied and exciting programme of visits is provided for delegates. Jagdschloss Kranichstein will be the setting for a reception given by the Mayor of Darmstadt, and the Deutsche Gesellschaft für Dokumentation, the Institut für Dokumentationswesen and Darmstadt itself, with its museums and art galleries, its concerts and theatre, offer many opportunities of interest and entertainment. By extending the Conference an extra day, it will be possible to include a visit to the International Book Fair in Frankfurt on the homeward journey.

More than usually this year, early application is advisable. The air charter arrangements that have been negotiated are very advantageous to members, but they have to be finalized by the end of July. Copies of the advance programme and any help or advice on attending the Conference can be obtained from the Conference Organizer, Aslib, 3 Belgrave Square, London SW1.

Problems of using external information services: a one-day symposium

One of the most important developments in recent years has been the growth in the number of national and international computer-based information services offering selective dissemination and retrospective searching facilities in the form of either printed output or magnetic tapes or both. The majority of these operate in specific subject fields so that a local information unit may find it necessary to subscribe to a number of these services, as well as to other commercially operated external services, in order to obtain complete coverage.

In theory it should be possible to balance such additional expenditure by some reduction in local effort, yet it is by no means clear how this is to be achieved. At one end of the spectrum it may be possible to envisage circumstances in which the total input to the local system comes from external sources; at the other, a completely in-house system may be more economical and effective. In between these two extremes a number of arrangements may be possible.

To examine these problems and suggest some solutions, Aslib is planning a one-day symposium on 15th June 1971, in the Scientific Societies' Lecture Theatre, Savile Row, London W1.

A brief analysis of the major problems encountered by local information units and individuals in using external services will introduce more detailed studies of the technology and economics involved in, for example, current awareness, dissemination and retrospective searching, as well as the rather different problems of the individual user. In the second half of the symposium, representatives of some of the major services will comment on the points raised in the earlier papers, and from this, and the discussion and summing up which will follow, it is hoped an indication of some possible solutions may emerge.

For further details, and a programme with a form of application, apply to the Conference Organizer, Aslib, 3 Belgrave Square, London SW1.

Controlled circulation journals

Company information officers, librarians and industrial publishers are all concerned with disseminating information within companies. Yet the growth of controlled circulation journals has led sometimes to confusion, occasionally to conflict, between the information officer and the publisher.

At the Aslib evening meeting to be held on Wednesday 21st April, Mr R. J. Findlay, Director, and Mr W. Streatfeild, Circulation Controller, of Morgan-Grampian (Publishers) Ltd, will present the publishers' case on the matter. They will discuss the subject on two fronts—firstly, why more and more publishers are moving over to this technique and the effect which dependence on advertising revenue has on the publisher; and secondly, the administrative problems in creating and maintaining a controlled circulation list. They will close with a plea for closer harmony between the two groups and the meeting will then be open to discussion.

The meeting will begin at 5.30 p.m. (tea 5 p.m.) at the Imperial College of Science and Technology, and will be chaired by Mr Leslie Wilson, the Director of Aslib.

Computer/Data Processing Group

Aslib, in co-operation with the National Computing Centre, Manchester, is proposing to set up an Aslib subject Group to cover the fields of computers and data processing. The purpose of the Group would be to study problems common to library and information services in the computer field (*not* the use of computers in information work) by acting as a forum for the interchange of information and materials.

A preliminary meeting will be held at Aslib on 1st April 1971, to ascertain the precise level of support, to elect officers and to discuss possible activities. Letters have been sent out to over 150 organizations with a possible interest in this field. If, however, there are any persons who would like to join or to receive information about the Group and who have not been contacted, would they please contact Alan Pritchard at the National Computing Centre, The Quay House, Quay Street, Manchester 3. (Tel. 061-832 9731, ext. 114.)

New directions in librarianship

The London and Home Counties Branch of the Library Association are holding their Annual Weekend Conference on the subject of 'New directions in librarianship', at Eastbourne from 30th April to 2nd May.

Speakers at the conference will be: Sir John Wolfenden, Director and Principal Librarian of the British Museum, who will speak on the BM Library and its future; Professor W. H. G. Armytage, Professor of Education at the University of Sheffield, on the future of education in relation to libraries; Dr D. J. Urquhart, Director of the NLL, who will consider the future of library interlending; and finally, Dr H. T. Hookway of the Arts and Libraries Department at the Department of Education and Science, who will talk on the DES and its relation to libraries. The conference was originally planned in anticipation of a Government decision on the re-organization of the national library structure. Now that the White Paper has appeared on The British Library, the organizers hope that this conference will prove to be even more successful.

Application forms are available from Gawan Vesey, Hon. Assistant Secretary, L & HCB, LA, 10 Herkomer Close, Bushey, Watford, Herts. WD2 3LW, to whom they should be returned not later than 10th April.

Automatic indexing and information retrieval

Professor Gerard Salton, Professor of Computing Science at Cornell University, will conduct a seminar on automatic indexing and information retrieval during the week 3rd–7th May, at the Rembrandt Hotel, Thurloe Place, London SW7.

The Seminar is intended for all those who are concerned with, or interested in, the future development of fully mechanized information retrieval systems, whether they are primarily involved with information or computer processing. Subjects to be considered will include: evaluation of indexing and text processing; automatic text analysis using either structural or statistical criteria; automatic dictionary constructing and processing; applications to library mechanization; and automatic question-answering systems.

Application forms are obtainable from Mr C. W. Cleverdon, Librarian, Cranfield Institute of Technology, Cranfield, Bedford.

Abstracting course

The CIRIA Information Liaison Group (CILG) is arranging a three-day course for the training of abstractors. The Group has already issued a Report, *Abstracts: Survey and Recommendations*, covering abstracting services and it was considered that a short course on the training aspect was needed, particularly within the construction industry.

The course will be held at the Holland Park Branch of the West London College, Airlie Gardens, London W8, from 2nd to 4th June 1971, under the joint auspices of ILEA and CILG. It will be limited to thirty students and will consist of lectures, practical work and tutorials. Subjects to be covered will include purposes of abstracts, existing abstracting services, variety and constituent parts of an abstract, types of abstract, keywords, descriptors and indexing.

The charge will be £7.50 (payable to CIRIA) which will cover the cost of the ILEA course (£1.50), documentation, lunches, morning coffee and afternoon tea.

Applications should be made as soon as possible to: The Secretary, CIRIA Information Liaison Group, 6 Storey's Gate, London SW1; or telephone 01-839 6881 and ask for Mr Goody or Mrs Knight.

NLL Announcement Bulletin

Volume 1, number 1, January 1971 of the *NLL Announcement Bulletin: a guide to British reports, translations and theses*, has been published by the National Lending Library for Science and Technology. This supersedes *British Research and Development Reports* which ceased publication with the December 1970 issue.

The new *Bulletin* will have a wider scope and will include not only British report literature, but also translations produced by British government organizations, industry, universities and learned institutions, as well as some doctoral theses accepted at British universities during and after 1970.

Recipients of *British Research and Development Reports* have been placed on the mailing list for the *NLL Announcement Bulletin.*

Information systems in the social sciences

OSTI support for the investigations of the information requirements of the social sciences expired at the end of 1970, and a final report is to be submitted in the spring of 1971.

Meanwhile, to ensure continuity, OSTI has awarded a one-year grant to Mr Maurice Line, Librarian of Bath University of Technology. During this period effort will be concentrated on data collection to study the structure of primary and secondary literature in the social sciences; on further analysis and co-ordination of research on information needs; and on preliminary research into systems design. Later collections of data will be carried out mainly by staff and students of the North-Western Polytechnic School of Librarianship.

One by-product of the work so far is a study by J. M. Brittain, *Information and its users: a review with special reference to the social sciences*, published in October 1970 by the Bath University Press in association with the Oriel Press.

Experimental Information Unit, Oxford

OSTI support for the Experimental Information Unit, at Oxford University, has been extended for one year by a grant of £24,600. During this extension the Unit will complete the comparative evaluation of selected chemical information services. It will also continue work on the evaluation and experimental use of the Index Chemicus Registry System, an information service based on new chemical compounds and their structure, and on the problems of constructing profiles suitable for the computer searching of sub-structures through Wiswesser line notations.

The Unit will also undertake work on other projects, including studies of the potential usefulness of current-awareness bulletins and experimental studies on the INSPEC tape services.

People and places

MR JOHN BLAGDEN, Manager of Library and Information Services, McKinsey and Company, Inc. (formerly at the British Institute of Management), and a member of the Council of Aslib, has been appointed a member of the Library Advisory Council (England). (A paper by Mr Blagden appears in this issue of *Proceedings*.)

BRIEF REVIEWS

ARBEITSGEMEINSCHAFT DER SPEZIALBIBLIOTHEKEN. Verzeichnis der Spezialbibliotheken in der Bundesrepublik Deutschland, einschliesslich West Berlin; 2., erweiterte Auflage, neu bearbeitet von Fritz Meyen. Braunschweig, Vieweg u. Sohn, 1970. 207 pp. *DM*84. (ISBN 3 528 08289 5)

The directory has doubled since the first edition. 1029 special libraries are listed in a classified arrangement following the UDC, with subject, geographical and name indexes. Entries give the following information: name, address, telephone, librarian, size of collection, number of periodicals taken, type of library—e.g., reference only, interlibrary loan activities, photocopying, microfilming facilities etc. Information was obtained by questionnaire and was correct as at 31st December 1969.

BRITISH HYDROMECHANICS RESEARCH ASSOCIATION. The hydraulic transport of solids in pipes: a bibliography. Compiled by Wendy A. Thornton. Cranfield, BHRA, 1970. 137 pp. £6.

This bibliography arranges over one thousand references to periodical articles and other publications under broad subject headings, with a subsequent chronological arrangement. The main subject divisions are: fluid mechanics; settling suspensions (covering coal, gravel, minerals, sands, etc.); non-newtonian suspensions (covering ash, cement, muds, paper and sewage, etc.); transport media; and installations and equipment. The foreword gives a brief introduction to the subject and indicates the magnitude of literature published in the main subject areas since 1950.

No cross-references are given in the text and, while a broad subject index is provided, a more detailed subject index would have facilitated access to the information contained in the bibliography. The author index includes both primary and subsidiary authors. References to only some of the 1969 literature are included, but a periodic updating of this bibliography is intended. The entry for each reference varies from bibliographical details only to comprehensive informative abstracts. References are individually numbered and publications held by the British Hydromechanics Research Association Library are indicated. This bibliography should prove very valuable in meeting the increasing demand for published information in this expanding subject.

CHEMICAL INDUSTRY DIRECTORY and Who's Who 1971. London, Benn, 1971. 439 pp. £7. (SBN 510 48703 3)

A new addition to this comprehensive directory of the chemical industry is a section on Chemical and Petroleum Engineering Contractors, which lists contractors in the UK, Europe, Japan, and the USA. This list contains information on the industries served by the contractors, the contractor's services and processes.

Otherwise the directory contains the same, very useful, sections as the 1970 edition, including a buyer's guide for chemicals and plant and laboratory equipment, a Who's Who and a Who Owns Whom.

DIRECTORY OF LIBRARIES AND SPECIAL COLLECTIONS ON ASIA AND NORTH AFRICA. Compiled by Robert Collison, with the assistance of Brenda E. Moon. London, Crosby Lockwood, 1970. 123 pp. £2. (SBN 0 258 967897)

The directory was originated by the Joint Committee of the Standing Conference of National and University Libraries and the SCONUL Sub-Committee of Orientalist Libraries. Libraries and special collections on Asia throughout the UK and Ireland are listed according to their localities. Details of address, staff, hours of opening, access, services and scope of collections are given for each entry. Names of libraries, special collections and subjects are indexed, and details of regional groups of Orientalist Libraries are also included. The information was contributed by librarians and its accuracy checked.

GUIDE TO THE SOCIAL SERVICES: a book of information regarding the statutory and voluntary services. 60th edition. Published for the Family Welfare Association. London, Macdonald & Evans, 1971. 320 pp. 70p. (SBN 7121 0709 6)

This book, which first appeared in 1882, aims to describe the various voluntary and statutory services which are available to the public in the UK. As can be expected, the changes in content which have taken place are necessitated by new legislation and provisions, such as the Local Authority Social Services Act 1970. The format remains the same as in previous years, with a contents list and full index, and each service is described clearly and in detail. Anyone needing information on social services in the UK will find this an indispensable reference tool.

THE ARCHIVES OF TWENTIETH-CENTURY SCIENTISTS AND TECHNOLOGISTS

PROFESSOR N. KURTI, M. M. GOWING, J. M. PYE *and* R. H. ELLIS

Papers presented at an Aslib Evening Meeting, Wednesday 25th November 1970

1. PROFESSOR N. KURTI, FRS, *Professor of Physics, Clarendon Laboratory, University of Oxford*

To start this discussion, I should like to give a brief account of the events that led to the establishment of the Joint Standing Committee on Records of Science and Technology of the Royal Society and Historical Manuscripts Commission and thus, ultimately, to proposals about the systematic preservation of the papers of present-day scientists and technologists. In 1957 Mr Roger Ellis was appointed Secretary of the Royal Commission on Historical Manuscripts and began his efforts to get the Commission more interested in records of science and technology. It was mainly at his initiative that a Commissioner with special responsibility for this type of work was appointed in the person of Mr Roger Quirk, a scientist by training, a mediaeval scholar and archaeologist. After lengthy consultations and discussions with scientists, Mr Quirk came to the conclusion that a useful first step would be the preservation of valuable labortory records when their originators retire or die. To this end the Master of the Rolls and *ex officio* chairman of the Historical Manuscripts Commission, Lord Denning, wrote in 1964 to all Vice-Chancellors and Principals asking them for their help. The response was very encouraging, but because of the untimely death of Mr Roger Quirk in 1965 and the failure to appoint another 'scientific' Commissioner, it seemed likely that the scheme might come to nothing.

It was some time later in the same year that active interest in the papers of present-day scientists was revived—although there was never any lack of interest in papers of scientists of the past—and this came about in the following way. Mrs Margaret Gowing, as the official historian of the United Kingdom Atomic Energy Commission and author of the book *Britain and Atomic Energy 1939–1945*, had in the course of preparing her book many opportunities for talking to scientists, especially to those who had played an active part in the development of atomic energy. She became deeply worried about the likely fate of many valuable collections of papers and manuscripts, especially when she heard distinguished scientists remark that they did not know what to do with all that paper, and that perhaps the best thing would be to build a big bonfire in their back-garden. She mentioned this point to me, and we both felt that this was one matter in which the Royal Society could, and should, take more active interest. I accordingly wrote to the Officers of the Royal Society and suggested that the Society might offer to look after the papers of at least some of its Fellows. The Officers were sympathetic to this idea, but said that a decision would have to wait until after the Society moved into its new quarters when it would be known whether space, etc. would be available. It was a little time after this event, in the spring of 1966, that Mrs Gowing, who has all along been the moving and guiding spirit in this exercise, approached Mr Ellis and told him of her concern about the papers of living scientists, and also about the possibility of the Royal Society being interested and able to help. This gave Mr Ellis an opportunity to revive the Historical Manuscripts Commission's involvement in the preservation of modern scientific records, and Lord Denning, as Chairman of the Historical Manuscripts Commission, took the initiative by writing to Professor Blackett, President of the Royal Society, suggesting the possibility of a concerted effort. As a result, a joint standing committee was set up under the chairmanship of Sir Harold Hartley, with the following membership: from the Historical Manuscripts Commission, Sir Robert Sommerville, Dame Veronica Wedgewood and Mr Ellis; and from the Royal Society, Professor Andrade, Professor Paton, and myself.

This committee has now been in existence for nearly four years and one of its main tasks has been to look into the preservation of recent records. The basic idea was that the Joint Committee might offer to sort out and preserve the personal papers and manuscripts of distinguished scientists, technologists and engineers on their retirement or on their death, so as to prevent them from being dispersed, lost or destroyed. The first task was to find out how much time, money and space would be needed to tidy up, outline-list and house such collections. Mrs Gowing very kindly undertook to carry out this task which consisted of sorting out the papers of three Fellows of the Royal Society, all of whom had died within the last fifteen years and whose papers were still in the same state as they had left them. With the kind agreement of Lady Gaddum, Lady Simon and Mrs Wager, Mrs Gowing looked at the papers of the late Sir John Gaddum, Sir Francis Simon and Professor Wager, and, as a result of this investigation, produced a report which gave an estimate of the money, work and space required to carry out this sort of work. The Council of the Royal Society received this report sympathetically, but it was felt that such an estimate should be supported by some concrete evidence. The only way this could be done was to process these three collections according to the general principles laid down in Mrs Gowing's report. We were very lucky indeed that, thanks to the kind permission of Dr W. C. Marshall, the Director of AERE, Harwell, Miss Pye of Harwell could take on this work. Miss Pye, besides having been the late Sir John Cockroft's secretary for several years and a records officer at Harwell, was also responsible for sorting out and arranging the Cherwell papers kept in the Nuffield College Library in Oxford.

The following papers by Mrs Gowing and Miss Pye will describe both the philosophy and practical execution of this scheme.

2. MRS MARGARET GOWING, *UKAEA*

I think that it is about four years since I spoke to the British Records Association about twentieth-century scientific and technological records. In recalling this, I realized that, during those years, interest in twentieth-century science and technology has perceptibly quickened. The chief activity has been in the United States where, for example, the Center for the History and Philosophy of Physics has developed important twentieth-century historical and archival work. In this country, the interest has spread out chiefly from the new university units for liberal studies in science, science policy and so forth, at Sussex, Manchester and Edinburgh. There has been increased inquiry into the history of science not only in the more conventional sense of the development of scientific ideas but in the sense of studies of the connection between basic and applied science, studies of innovation, of international technological co-operation, of the evolution of governments' science policies. Much of it is within the framework of the modern analysis and methodology of the social sciences. Journals are now appearing with specific interests in twentieth-century science and technology.

Nevertheless all this is only a beginning. The main-stream historians—the ordinary historians—who make the twentieth century their parish, mostly at present ignore science in a way that would be unthinkable to their colleagues interested in the seventeenth and eighteenth centuries. And the social scientists are only *just* moving into the economics, sociology, politics and psychology of science and technology. It is always difficult to predict what will interest future generations of historians but I think we can safely say that they, the social scientists, will be far more interested than they are today in the ramifications of twentieth-century science.

This means that it is important that far more thought should be given to the records of scientists and technologists. We have had agitations about the records of politicians or generals and admirals and we know that even the blotting paper of contemporary poets and novelists has a high market value, but few people so far have bothered very much about scientists' papers. Eminent scientists may not realize what a potentially valuable capital asset their filing cabinets represent!

Where are these records? Some of them are in scientists' own homes and personal offices and are considered by them to be their own private collections. The exercise of the joint Historical Manuscripts Commission/Royal Society Committee has been concerned with this type of record, and my intention here is to say a little about the pilot study Miss Pye and I did for this exercise. But before doing so I should like to refer briefly to the institutional records of scientists and technologists.

Nowadays these men and women usually work in teams so that the bulk of their records may be embedded in their institutions—in universities, research establishments, government departments and industrial firms. Some of the studies I have already mentioned—for example, about innovation—will depend on the availability of such institutional records. If we want good archives for twentieth-century scientists and technologists we must look to all these bodies to establish proper records systems; and I am sure that a good deal needs doing here. As far as government departments are concerned, the Public Record Office recently appointed an officer specifically concerned with scientific archives, but I doubt whether many universities or firms have systematic arrangements. I should just like to draw on my personal experience to say that devising proper archival systems for large scientific and technical organizations is not as dauntingly difficult as it sounds. I became the first archivist, as well as historian, of the Atomic Energy Authority in 1959. This was an organization employing over 30,000 people scattered over ten sites and where nothing had been done about the old files which mostly had been left in dumps; the kind which are both the joy and the despair of historians where, for example, one may find priceless records in old cornflake cartons with the bottoms falling out. Having decided to appoint an archivist, top management in the Authority took the job seriously, devoting few, but good, staff and other resources to it: as a result, chaos was reduced to very good order in a very short time—within two to three years. The credit belongs, I hasten to add, to the records officers in the individual establishments, and it is important to note that none of them had any previous experience of archives work but were administrators of, in civil service terms, higher or senior executive officer rank. They did a first class job and proved that professional training is not essential for such work. The lack of trained staff is not an excuse for failure to tackle the problem!

I should like to return now to the private records of individual scientists and technologists. However, before discussing the Historical Manuscripts Commission/Royal Society survey, I should like to say again that other groups have become increasingly interested in this whole area. Churchill College, Cambridge, has exceptional archive resources for an individual college and since the emphasis in its foundation was on science and technology, it is fitting that the college should be gathering in collections of papers from certain famous twentieth-century scientists and engineers. Sussex University Library, in collaboration with the Science of Science Foundation, has also been collecting some scientific records. Meanwhile the Science Policy Research Unit at Sussex is carrying out an important project to locate, identify, count and briefly catalogue existing collections of letters, papers and unpublished materials of about 3,000 British scientists who flourished between 1850 and 1939. At the same time they are using the information they collect for a preliminary study of the scientific community in these years. In the course of their work they have been offered collections of manuscripts beyond anything their library can hold and their own terms of reference do not extend to making archival arrangements.

This point leads straight into the pilot survey about which Professor Kurti has told you and which arose out of the fear that scientists' papers, through lack of proper arrangements, might go on to bonfires. Miss Pye and I were asked to do a pilot survey for the Historical Manuscripts Commission/Royal Society Committee of the papers of Sir John Gaddum, Sir Francis Simon and Professor Wager. We set out to answer two main questions. First, were we right in thinking that there really was a problem about the sorting, weeding, and preservation of distinguished scientists' papers? Or were the scientists' families able to do the work themselves? Or did they know already of archives where the job would be done for them? The answer to the two last questions was an emphatic 'no'. It was clear that Lady Gaddum, Lady Simon, and Mrs Wager were very worried about what to do with the papers and what would ultimately happen to them. They felt that it would be a tremendous relief if somebody was available to help them and who could take responsibility for the papers. I should add that in the cases of Sir Francis Simon and Professor Wager many of their papers still remained in their laboratories, looked after by close ex-colleagues. But these colleagues too had no clear idea what would happen to the records when they themselves left the laboratories. Certainly there have been sad stories about the fate of the Rutherford papers which were left in the Cavendish Laboratory.

Our second main question in the pilot survey concerned the amount of labour and space needed for sorting and procuring such collections. Miss Pye will be going into this in detail in the paper which follows, so I will not deal with it here. I will simply say that the first sight of numerous boxes and trunks made the task seem formidable, but it soon appeared that the problem was in fact eminently manageable. Here I should emphasize one important point. We regarded it as axiomatic that these papers should be treated like most modern records, for example like those in the Public Record Office. The sheer bulk of such records makes it impossible to list every single document, as if it were a mediaeval manuscript. Instead, files of documents are named and listed and pieces of paper within a file are simply given a page number. With this fundamental and necessary limitation it did not seem to us that the labour of sorting and preserving the three collections would be great. (The figures appear in the Appendixes.)

All in all we were impressed with the historical importance of the papers of these three Fellows of the Royal Society. We felt that it would be a relatively simple task to ensure that such records were authoritatively cared for on the death or retirement of a Fellow, and that if such arrangements were not made there was a real danger that the papers of eminent scientists might be lost or destroyed. The costs in terms of labour and space of sorting and preserving the papers seemed to us a very small price to pay for handing on to future generations this important evidence from the history of our times.

3. MISS J. M. PYE, *AERE, Harwell*

Introduction

It is my part this evening to tell you how we tackled the task of arranging and listing these three collections, the papers of Sir Francis Simon, Sir John Gaddum and Professor Laurence Rickard Wager. I am aware that the method we chose to adopt is somewhat controversial and may not please those archivists who have been trained in proper care of eighteenth- and nineteenth-century scientists' papers. However, this is the late twentieth century and a time of rapid technological change even in the library and archiving world. We have done our best to import the best features of record handling in the public sector into the private academic world to which these three late scientists belonged.

The three subjects

The three scientists whose papers were chosen for the pilot scheme were all Fellows of the Royal Society.

(1) *Sir Francis Simon, 1893–1956*

His scientific interests comprised the whole field of low temperature physics. He worked first in Berlin and later at Breslau; in 1933 when Hitler came to power he realized that his work and family would be jeopardized by the Nazis, so he accepted an invitation from F. A. Lindemann to start a Low Temperature Department at the Clarendon Laboratory in Oxford. In 1940 he was invited to join the MAUD Committee and devised the first diffusion separation plant for extracting fissionable uranium from the natural isotope U238. This was a crucial step in the development of an atomic weapon by the UK. He remained for many years a consultant to the UKAEA on diffusion plant work. After the war Simon developed a keen interest in the wider political and social aspects of science and technology, and expressed his views with some force. During 1948 to 1951 he was Scientific Correspondent of the *Financial Times* and wrote for a wide audience on such topics as scientific and technological manpower shortage, and the economics of nuclear power. He was a member of the British Electricity Authority Research Council and Chairman of the Very Low Temperature section of IUPAP. In October 1956 he succeeded Lord Cherwell as head of the Clarendon Laboratory, but occupied that appointment for a month only, before his death. His working files at the Clarendon, together with many boxes of older correspondence from his home, included letters to a world-wide circle of friends and fellow workers, some 350 or more, with exchanges continuing over many years. Full details are in his Royal Society biographical memoir, published in 1958.

(2) *Sir John Gaddum, 1900–1965*

Sir John Gaddum was distinguished for research in pharmacology, which he first took up at the Wellcome Research Laboratory in 1925. He then worked under Sir Henry Dale at the National Institute for Medical Research. After a brief spell at Cairo he was appointed Professor of Pharmacology at University College. He worked on chemical warfare at Porton during the war and moved in 1942 to Edinburgh where he was offered the Chair of Materia Medica; here he built up an outstanding research department. Finally he became director of the Institute of Animal Physiology at Babraham, Cambridge, which, under his direction, became a famous international centre for physiology and pharmacology research. He was responsible for a new textbook on pharmacology which has since become a classic, and has been translated into several languages.

(3) *Professor* L. R. *Wager, 1904–1965*

Professor Wager was a geologist, and the organizer and leader of two major scientific expeditions to East Greenland. He participated in a number of other expeditions including that of Gino Watkins to prospect the British Arctic Air Route in 1930. He earned a high reputation as a climber and mountaineer in Britain and the Alps, and joined the 1933 Everest Expedition as geologist. His academic work was carried out first at Reading University, later at Durham and from 1950 until his death, at Oxford. In a few years he made Oxford one of the leading centres in this country for the study of petrology and geochemistry, and set up the first group to study radiometric age dating of rocks.

During his pioneering survey of East Greenland he discovered a group of plutonic centres of unique interest. A second exploration in the summer of 1935 was followed by an over-wintering expedition based at Skaergaard, whose programme included geological mapping and full study of the layered intrusion of the Kangerdlugssuak area. Some 35,000 square kilometres of difficult mountain and glacier country were mapped by Wager and his very small team. A final 'rounding off' expedition was planned for 1965, but unhappily Wager did not live to take part, and it was led in 1966 by his friend and colleague Professor W. A. Deer. Wager's prime achievement was to link the plutonic centres of East Greenland, whose origins he was able to date closely, with the major movement of the earth's crust in the Atlantic area causing the uplift of the Greenland mountain belt and the sinking of the Denmark Strait. His work on the Skaergaard layered intrusions led to a satisfactory understanding of the way in which these layers were formed.

A full account of the lives and work of both Gaddum and Wager will be found in Vol. 13 of the Royal Society's *Biographical Memoirs.*

Despite the very different fields of science in which these three distinguished men had worked, examination of their papers revealed many points of similarity. May I say here that although I have picked up a layman's working understanding of atomic energy, I knew no geology and nothing about low temperature physics or pharmacology when I began this study. I am grateful both to Professor Kurti and to Professor David Vincent of Oxford's Geology Department for their help in sorting the papers, and for continued guidance during the work. To have a 'scientific sponsor' for each collection is really essential for anyone who intends to arrange and list papers of this kind.

Institutional records

These collections do not of course cover the whole of the life work of these three men. A complete set of their publications will be available in the Royal Society library, but in so far as scientists work within institutions, as Sir John Gaddum did at Babraham, or as Sir Francis Simon did for the UKAEA, their contribution to the work of these institutions will naturally remain with the proper custodians, that is the Institutions themselves. Eventually they will no doubt pass to the Public Record Office. It is the private or semi-private papers with which I have been concerned.

The formal scheme

During a preliminary survey undertaken mainly by Mrs Gowing, with some help from me, we found it possible to identify quickly some distinct classes of documents amongst the collections. At the beginning of the pilot study these classes were revised and refined in the light of what was found, and our final scheme was one of seventeen classes, set out in the 'List of Categories' (see Appendix A). Though the proportion of material in each category varied from one collection to another the pattern was remarkably similar. This was not surprising because it springs from the nature of scientific work: personal research, correspondence with fellow workers around the world, publications in learned journals, lectures, participation in academic and public life. From my experience in handling scientists' papers, I formed the opinion that a scheme on these lines would be suitable for the majority of similar sets of papers to be found elsewhere.

A numbering scheme for records which will eventually be accessible to historians is of course essential. The Public Record Office insist on the renumbering of all records deposited with them so that, in their archival state, the records will conform to a total scheme. The file folders in these collections, as we found them, rarely bore any number and the majority were arranged alphabetically by name or by the first word in a longer title. I have allotted sequential numbers to all files within each class before listing them, and I have not hesitated to do a certain amount of rearrangement of papers where the sense and context clearly required that this should be done.

Reduction of papers not judged worthy of preservation

It is well known that historians are most reluctant to agree to the destruction of any documentary material whatsoever. On the other hand the costs of storing all the vast quantities of records which can so easily be produced by modern reproduction techniques are liable to be out of proportion to their worth. No scheme for the preservation of scientists' papers on a regular basis could hope to succeed unless we could show that it would require a minimum of professional time and storage space.

We have adopted the policy of discarding material which either duplicates records known to exist elsewhere (e.g. Committee papers and complimentary copies of other authors' offprints) or which was in our opinion purely ephemeral, e.g. Christmas greetings or holiday postcards, domestic trivia, etc. In the case of Committee papers, we have followed the well-established principle that the secretariat of the Committee is responsible for keeping a master set of papers. The fact of tenure of membership of such Committees or working parties was listed and recorded, but the actual papers were set aside.

Revisions of first drafts of publications were also set aside in cases where the revisions were purely editorial or typographical.

This segregation of less valuable material from the hard core of the collections enabled me to reduce the total quantity by about two-thirds of its bulk. Details are given (Appendix B) of the original footrun of all three collections (66½ feet) and the footrun which was finally boxed and shelved (24 feet).

The scheme is a first phase only

I would like to stress that this scheme is only the first step in the proper preservation of order and readability of these papers in the very long term. The quality of modern paper used for carbon copies is so poor that file folders much handled by historians would soon become tattered. An immense amount of work still remains to be done in the cross-indexing of correspondence under name of writer, in protecting manuscript material liable to fade, in preventing typing paper from becoming brittle and in laminating with polyvinyl coverings where necessary. What we have done is to bring some rational order into the papers so that the fact of their existence at least will be available to students of scientific history.

Method of procedure

For those who would like brief details of the way in which this study was done, here is an outline.

1. Papers were sorted roughly into categories.
2. Within categories, papers were grouped by subject or by source. If the original file folders covered their subject satisfactorily, they were taken straight into the scheme. If rearrangement was necessary to achieve a logical grouping, this was done.
3. Papers were arranged in date order inside the file jackets, and tagged in to preserve the order.
4. When all files were made up they were numbered consecutively within each category.
5. Archiving dockets were made out for each file in looseleaf form. A double set was prepared, one to be filed in name order, the other in chronological order.
6. The numbered files were loaded into dustproof boxes, the box number being recorded on the archive form.

Conclusions

From the time spent on these papers, some fifty man days, we drew the conclusion that one professional archivist and one clerk could provide a 'rescue service' on these lines for the papers of perhaps twenty or thirty scientists a year. The quantity to be handled would depend on how large a proportion of a scientist's papers were already cared for within some recognized institution with record handling facilities. Two of the three collections in this study belonged to men who had 'died in harness' and had had no opportunity to sort their own papers before retirement. It is reasonable to suppose that given time and an acceptable scheme, some scientists might be prepared to go through their own private papers as an occupation during retirement. We welcome this opportunity to make the experiment better known to a wider audience. There is no doubt that so much of the history of our own generation has been influenced by science and technology that the contribution of individual scientists will be of the greatest interest to future historians.

Finally I would like again to express my thanks to all those who gave me so much help with these papers, particularly to the three ladies most closely concerned, Lady Simon, Lady Gaddum and Mrs L. R. Wager.

4. R. H. ELLIS, *Secretary, Royal Commission on Historical Manuscripts*

During this meeting we have heard from Professor Kurti how the Royal Society and the Historical Manuscripts Commission approached the problem of scientific and technological records, and of the appointment of their Standing Joint Committee to deal with this problem. We have also heard from Mrs Gowing and Miss Pye of how a pilot scheme was framed and carried out. This pilot scheme had two objectives. The first, as Professor Kurti told us, was to discover what was needed in terms of staff, time, money and equipment to arrange, weed and list the personal papers of contemporary scientists; in short, to quantify the problem. The second objective was to provide a pattern for this operation which could be followed in all similar cases.

The work done by Mrs Gowing and Miss Pye has been so excellent and so 'finished' that you may well have been left with the feeling that there is nothing more to be said or done. This would be quite erroneous, for their work is in fact only a beginning. The question we have to take away with us is: How can that work be continued?

A number of people and agencies are already at work in this field, but I find it easiest to speak from the point of view of the Standing Joint Committee. At an early meeting of this Committee, Sir Harold Hartley, who was then chairman, wisely insisted that if the Committee was to be effective—to produce results rather than mere activity—it must have limited and accessible objectives. The Committee has therefore addressed itself to two specific tasks, viz. (1) the publication of a *Guide* to the location and content of the personal papers of leading British scientists from the sixteenth century to the time of Lord Rutherford, and (2) ensuring the location, preservation and accessibility of the personal papers of British scientists from Lord Rutherford's time to the present day.

The *Guide*—financed, as Professor Kurti has told us, by the Goldsmiths' Company, and edited by Dr R. E. W. Maddison—has made steady progress, and material for a first volume is now in typescript draft.

The pilot scheme about which we have just heard was the first step towards the second objective. When the pilot scheme is thus put in its context, you can see how much still remains to be done.

There is a third task which, before the appointment of the Standing Joint Committee, had been tackled in at least a preliminary way by the Historical Manuscripts Commission. I refer to the *institutional* records of science and technology, the records generated and kept in laboratories and other places of research (e.g. in universities, research institutes, and industry), which join with the personal papers of scientists to form the documentation of the history and progress and social impact of science and technology.

Now the Standing Joint Committee has a basic aim, of which its declared objectives are two aspects. This is, to create a state of affairs in which the records of science and technology, both institutional and personal, are accepted and taken for granted as a major primary source for the history of our country and of our age. The records of politics and of politicians, of diplomacy and of diplomats, more recently of industry and commerce and of the men who built them up, have already achieved this status. The records of science and technology have not yet, so to speak, arrived. They are less accessible—in two senses: their location is less easy to discover, and the interpretation of their contents can require special knowledge which historians do not always possess. For these reasons their preservation is not yet regarded by historians of all schools as something to be taken for granted.

Institutions can keep their records in three ways. They can simply keep them, attempting nothing in the way of arrangement or accessibility. This is not recommended, but it is better than throwing them away. Or they can hand their records over to a fully-equipped repository, which will see to their arrangement and listing and production; or they can employ archivists themselves. Both these courses are excellent, but before either can be fully effective there must be archivists available with appropriate training. Until very recently the Diploma Courses in archive administration were geared primarily to the needs of records of earlier date and different content—the records, for instance, of land-owning families or of ancient boroughs. Last year some of us set to work to supply the new need, and the revised syllabus of the postgraduate Diploma Course in Archive Administration at University College, London, now offers a new and wider range of options which allows an intending archivist to omit the older subjects (such as mediaeval Latin and palaeography) and to study instead such subjects as the history of science and technology, the development of Company Law, or the use of computers for information storage and retrieval. This new syllabus is now being offered, and forms the first step towards special training for archivists who will work on the records of industry, science and technology. This is a long-term measure and it will be a year or two yet before its effects are fully apparent; but the records of science and technology are going to be with us for a long time and the problems of their preservation and use have got to be tackled at the roots. It is no use exhorting institutions to keep their records properly if they can find no trained staff to do it for them.

The personal records of scientists are another matter. The Historical Manuscripts Commission's first initiative—the Master of the Rolls' letter to Vice-Chancellors of Universities, which Professor Kurti has mentioned—aimed at the preservation of institutional records. The Standing Joint Committee has had second thoughts about this and believes that the location and preservation of personal records are the more urgent tasks. There are two reasons for this view. Leading scientists are nowadays more and more involved with Government policy, either specifically as advisers or because their work has political implications of which they are aware; and this aspect of their work will be reflected in their personal papers rather than in the records of team-work in their laboratories. And if other scientists have not operated at this level, however significant scientifically their work may be, there is a real danger that their papers may be regarded as of too little or too restricted value to be worth preserving. In either case such personal papers are exposed also to domestic hazards—such as when a retired professor or his widow moves into a smaller house—by which institutional records are less frequently menaced.

The pilot scheme has established how these personal papers should be treated. The next step is to extend this treatment to as many more such collections as possible. What the Standing Joint Committee now proposes is that whenever a Fellow of the Royal Society, or of one of the technological Institutions, dies and his papers are in jeopardy, his widow or his representative will receive a visit (previously arranged) from one of a small corps of 'Itinerant Archivists' who will examine the papers, weed and arrange and list them (either on site or elsewhere), and arrange for their preservation in a record office or library where they can be used. Storage need be no problem, since the bulk of these records is not large by archival standards, and this country is better provided with record repositories and departments of manuscripts than most people are aware. But the scientists and their families will not know this unless someone tells them; and at present the repositories, though between them they have space, have not yet the staff to undertake the visits or the listing. The Itinerant Archivists will have several functions, acting as scouts, ambassadors, archivists and brokers in turn, but not the least important of their duties will be to supplement and advise the existing staffs of record offices until those offices—or rather the authorities which finance them—have received our message and are prepared to accept the location and processing of scientific and technological records as part of their normal activity. In other words, we see the Itinerant Archivists scheme as an extension of the pilot scheme, both in scope and in time, and we hope that the work which they will initiate will in due course be absorbed by the country's archive services as a whole.

The plan is, we are sure, a sound one, but it will cost money which at present we have not got. Getting it is now the Standing Joint Committee's first priority. We are, I believe, begging in the right quarter and we are full of hope.

I mentioned earlier that other agencies also are at work. The Business Archives Council has been active for a long time in rescuing the records of industry and the technological records which these increasingly include, and it is in great measure due to the Council that more and more business houses are employing their own archivists. The Standing Commission on Museums and Galleries is becoming very interested in industrial archaeology and is developing a plan for the older records of industry very similar to our own Itinerant Archivists plan.

And behind all these activities stands the National Register of Archives, maintained by the Historical Manuscripts Commission. This Register is in fact a large and growing 'Bank' of lists and reports upon archives of every kind, all over the country, without limit of date, with massive indexes of subjects, persons and places. At present the Register contains about 14,000 lists, and they are added at the rate of about 1,000 every year. Some of these are made by the Commission's staff, but most of them are sent by the record repositories and libraries by whose staff they are made. The records of science and technology are included and the number of lists of them is growing. I hope that all archivists, whether itinerant or static, who have listed collections of scientific and technological records will either continue or begin to send us copies of their lists, and so help us to build up the National Register of Archives into the major central reference point for all research based upon these records.

APPENDIX A

Categories for arrangement of scientific archive collections (Revised Scheme)

Number	*Title*	*Comments*
1	Diaries (a) Personal diaries (b) Scientific diaries	e.g. of expeditions abroad
2	Reprints, without mss. notes or correspondence (complimentary copies)	For destruction or offer to libraries
3	Laboratory notebooks and working papers	
4	Theses (text and assessments)	i.e. texts of students' theses, not the work of the subject of the collection. (Proposed that such texts be left at the place where the work was carried out)

5	Texts of lectures, addresses or speeches to public bodies—and notes for courses of lectures	Invitations to lecture to be treated as correspondence
6	Reports on visits abroad or external	
7	Manuscripts or drafts of published/unpublished work	
	(a) typescripts with/without amendments	
	(b) manuscripts, unpublished	Of potential financial value
	(c) drafts for official reports	
8	Committee papers (the fact and duration of membership to be recorded, sets of papers duplicating the master set (i.e. the Secretary's set) to be discarded)	
9	Lecture slides and photographs	
10	Extracts from National Press, printing articles or letters by the subject of the collection	
11	Subject's publications (books and offprints of articles, etc.)	
12	Miscellaneous press cuttings. (If autobiographical, file under 15)	General interest only—propose discard
13	Conference proceedings	If author's contribution published in scientific press, file as 11. In other cases fact of attendance to be recorded but proceedings discarded (available in libraries)
14	Correspondence This will be arranged as convenient, by subject topic or by source. The following groups of papers will recur in many collections: Invitations to lecture Invitations to Conferences Requests to provide references or testimonials Requests to review theses Patent correspondence Royal Society correspondence British Association correspondence Articles for Scientific and Technical Press, books or contributions to books	
15	Miscellaneous	
	Personal souvenirs, etc.	Keep if they throw light on subject's interests, domestic life, etc.
16	Maps and Plans i.e. fieldmaps with annotations by author, or plans drawn by him	Simple topographical material to be discarded
17	Pictorial material Sketches etc.	

APPENDIX B

Disposition of papers in the original collections of Simon, Gaddum and Wager

Papers	*Original total footrun (linear feet)*	*Discarded (linear feet)*		*Archived (linear feet)*
SIMON	19	Committee papers	4	
		Reprints and brochures	1	
		Draft publications	1	
		Spare copies, duplicates	½	
		Ephemera, misc. minor letters	1½	
		Returned to Lady Simon (domestic)	1	
			9	10
GADDUM	23½	Reprints and brochures	10	
		Draft publications	½	
		Spare copies, duplicates	½	
		Ephemera, misc. minor letters	½	
		Left with Lady Gaddum (diaries, domestic)	5	
			16½	7
WAGER	24	Committee papers	2½	
		Reprints and brochures	2	
		Draft publications	3	
		Ephemera, spare copies, misc. minor letters	2½	
		Left with Mrs Wager (diaries)	2	
		Left with Department		
		(rock catalogues)	2½	
		(maps, aerial photos)	1½	
		Personal souvenirs, press cuttings	1	
	TOTAL 66½ feet		17	7
				TOTAL 24 feet

Adapted from Annex A of Miss Pye's report on Pilot Study Scheme.

DISCUSSION

MR J. FRIDAY (University of Sussex) said that at Sussex they had discovered several large collections of papers of scientists who were far from eminent, but, considering the emphasis Mrs Gowing and Miss Pye had placed on the records of *eminent* scientists he wondered what criteria one could use to decide whether to keep or discard the papers of lesser men. Often, for example, local amateur scientists, who had spent years recording meteorological or natural phenomena, might leave important records, for use in comparative studies, etc. PROFESSOR KURTI suggested that a small panel representative of the Royal Society, the engineering institutions, the medical organizations and the Historical Manuscripts Commission might be set up to select those scientists whose papers should be preserved.

MR J. L. HALL (UKAEA Culham Laboratory) said that the 'institutional' record had been mentioned several times—but there was one form of institutional record that seemed to be particularly at risk. This was the record held at institutions other than the scientist's institution, and in particular tape and video recordings might be especially valuable. He asked if any of the speakers would comment on the question of tape records as suitable material for archiving? MRS GOWING said that tape was included among archives both at the Public Record Office and at the UKAEA. PROFESSOR KURTI said that the Royal Society was concerned at the amount of both tape and film that was destroyed by the BBC, and was endeavouring to have some of it preserved.

MR L. COTTEN (The Institute of Physics) said that he was very interested in the suggestion of Miss Pye that retired scientists might be requested to sort out their personal archives on an agreed scheme. This proposal might well be a considerable help in dealing with the less eminent scientists. The categories for arrangement could be published with an explanatory leaflet. The leading professional and learned societies should be a valuable channel of communication with their members. MISS PYE agreed that this would be useful.

MR R. A. FAIRTHORNE strongly supported the suggestion that institutions should inform retired or retiring members of what kinds of papers might be important. His whole working life had been spent in a losing battle against masses of personal papers. The values he put on these were quite contrary to those of the archivists. For instance his working notes and drafts for published papers were of little value, as far as he was concerned. The published offprints were what he cherished because these were what people asked for. His files of correspondence were just too enormous to keep, and still leave room to move about the house.

DR R. M. MACLEOD (Sussex University) suggested that panels of historical consultants might be appointed to the chief learned societies in London and Edinburgh, who would respond to appeals by members of those societies who had papers to catalogue. Advertisements might be periodically carried in the journal of each learned society, drawing the attention of members to these 'historical panels' and asking their collaboration in the task of preserving papers still in private hands. MRS GOWING said this was largely a question of labour. There were not many people available to do this work.

MR D. R. WILLSON (UKAEA) asked what 'the pay off' was on archives and how were they used to good purpose. PROFESSOR KURTI said that archives were part of our culture and it was not possible to know their value for perhaps two hundred years. MISS GOWING said that it was impossible to write history without archives—only they could document the themes of current controversy.

MR F. R. WHITT (Ministry of Defence) asked if the linear footage quoted as papers belonging to Simon, Gaddum and Wager included their published books and scientific papers? MISS PYE replied that only personal notes were considered.

SOME PROBLEMS OF USING AN UNSTRUCTURED INFORMATION RETRIEVAL LANGUAGE IN A CO-ORDINATE INDEXING SYSTEM

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Project FAIR
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Paper presented at a one-day Seminar of the Co-ordinate Indexing Group, Birmingham, 30th June 1970

Introduction

The title raises at least four questions:

(1) What do we mean by 'Information Retrieval Language' (IRL)?
(2) What kind of co-ordinate indexing system could have an unstructured IRL?
(3) What do we mean by 'structure' in this context?
(4) What are some of the problems of using an unstructured IRL?

We will discuss possible answers to these questions with a view to helping us to decide how much intellectual investment we should make in the course of structuring our various systems.

(1) What do we mean by 'Information Retrieval Language'?

If we take the loose definitions of:

'Information' to mean knowledge in transit
'Retrieval' to mean recovery by investigation
and
'Language' to mean a vocabulary and way of using it

then we can, perhaps, accept the suggestion that an IRL is a vocabulary and way of using it to recover by investigation knowledge which is in transit.

Furthermore, by loosely defining:

'Vocabulary' to mean the words in a language (in an alphabetical list)
and
'Index' to mean a list of names, subjects, etc., with references

we can see that 'IRL' is approximately synonymous with 'Index vocabulary'. The point of these definitions is that it matters to us that we know that what we are discussing are the crude beginnings of a thesaurus. For instance, the descriptors which are the titles of feature cards could be listed and thought of as an IRL. The need might arise to develop this list into something resembling a complex lexicon, or thesaurus, or we might be able to use it in its unstructured form.

(2) What kind of co-ordinate indexing system could have an unstructured IRL?

Certainly not a pre-co-ordinate indexing system, because by definition they are structured; for example, a book index or a faceted classification. Only certain kinds of *post* co-ordinate indexing systems could have a relatively unstructured IRL. Large collections which have a feature card index or computer-matchable descriptor lists must be structured in some way. Smaller feature card indexes, edge-notched card indexes and 'flat tray visible' indexes may be efficient enough without much structuring of the IRL. This could apply to most edge-notched card systems, as they are unlikely to be used for collections much above five thousand articles in size.

(3) What do we mean by 'structure' in this context?

Some kinds of structuring:

A. Alphabetical listing of descriptors

B. Grouping of descriptors in clumps where they are related by:
  - (i) subject (rough classification)
  - (ii) a more formal hierarchy
  - (iii) word type (grammatical, roots)
  - (iv) interrelated (maps of meaning)
  - (v) facet or concept type (properties, instruments, etc.)

C. A glossary to help one find the appropriate descriptors:
  - (i) with see, use, see also references, etc.
  - (ii) with generic/specific relationships shown.

D. A guide to usage. For example, rules, limitations, links and roles

E. Special sub-sections, codes, classification, etc.

F. Limitations as to size, additions, etc.

G. A thesaurus which might include all the kinds of structuring mentioned.

Various degrees of structuring

It will be obvious by now that a completely unstructured IRL in a co-ordinate indexing system is most unlikely. We must think in terms of a spectrum of structuredness; because it is clear that various systems will need to use the different kinds of structuring to different extents.

Some reasons for and against structuring

These depend on the circumstances pertaining to a given or proposed indexing system. In this connection, it helps to have a look at the consequences of index vocabulary control, which is the use of existing index units with controlled additions when necessary. The advantage is a likely raising of recall ratios. The disadvantage is more expensive indexing due to having to look back (for example, by using a thesaurus). This kind of control is an important cause of the need for up-dating, and is practically inevitable in any indexing system.

FOR structuring:
- (a) Consistency of indexing (but that this is a good thing has been challenged)
- (b) Search formulation
- (c) Memory aid
- (d) Guide to use and understanding

(c) Economy in the case of special codes (e.g. trigraphs)

AGAINST structuring:
(a) Economy—minimal intellectual investment
(b) Simplicity for certain classes of user (e.g. non-librarians)

(4) What are some of the problems of using an unstructured IRL?

We have had some experience of this in Project FAIR (Fast Access Information Retrieval) which is a Specialized Information Centre for Biomedical Engineering. Like any other information centre, it collects, organizes, stores, and retrieves information. What makes it 'specialized' is that it disseminates a new bibliographical tool to a worldwide clientele, i.e. it publishes IRBEL (Indexed References to Biomedical Engineering Literature): three issues per annum; 640 references per issue (booklet); plus a pack of feature cards with each booklet (approximately 320 cards).

In our case, the co-ordinate indexing system includes the publishing of a mass-produced feature card subject index. We have already discussed the fact that there are different degrees of 'structuredness'. This difference can extend to a difference in the degree of structuredness in indexing, as opposed to retrieval:

(a) For indexing, we use a partially structured IRL, which has: alphabetical listing of main terms; terms with related meanings are shown in maps of meaning analogous to the EURATOM Thesaurus; infrequently used, highly specific descriptors are given a trigraph code, where the terms are clumped by facet or concept type; control is exercised by a promotion/demotion procedure between main term and trigraph sections, depending on frequency of use and fashion. A new development is the integrations into facet groups, of both main and trigraph terms.

(b) For retrieval, a relatively unstructured IRL is given to the users who are doctors, engineers, etc., quite unused to the indexing subtleties which are the stuff of life to librarians and information officers. The main terms, about three hundred, are simply listed in alphabetical order. The trigraph terms, with their three letter codes, are in a separate section, in facet clumps. Users have to scan the entire list until they locate descriptors which might express the concepts they wish to search for.

A special point about our index vocabulary control should be made here. It is obviously economically important for us not to mass produce cards with only one or two holes in them—this means that we have to pursue a policy of minimizing the number of main terms. It also means that the trigraph section is well used, with some codes being punched up to 10 or so times. We review the IRL after each issue (640 articles) and ruthlessly promote and demote descriptors which are fashionable or little used.

By this time you will all have realized some of the problems which we have encountered ('we' being both the indexers and users, for local enquiries). Other problems have been identified by our users (the recipients of IRBEL):

1. Our indexing consistency, i.e. the way our two indexers would index the

same paper, is not maximized. In other words, this is not a primary aim, and is not the main reason behind the limited structuring we have done. We are not wholly convinced that this kind of indexing consistency is necessarily a good thing. Evidence has been produced (q.v.) which suggests that a certain amount of this kind of inconsistency, coupled with a degree of indexing/searching inconsistency, can be a good thing, i.e. tends to improve recall and relevance ratios for certain kinds of co-ordinate indexing systems, including ours. (See reference 2 below).

2. In formulating our own searches, we have had very few problems, due, I suspect, to our thorough knowledge of the language, but users have complained about having to scan the entire list of main headings for the terms they want. They have also shown dislike of having to look in two different places (main terms and trigraph terms) for their descriptors. This has given rise to our most recent development of combining the two sections, and putting them all into facet groups. This has had to be balanced by the need to keep our published IRL, and the guide to its use, as simple as possible for our 'lay' users.
3. The absence of a glossary has been a problem in both indexing and searching. The problems caused by not having descriptor definitions, by not having the specific/generic relationships indicated, by not having the partial (which are the worst) and complete synonymous relationships shown, by not having antonyms and homonyms explained, and so on, have been many, and there is no knowing how much inefficiency has resulted. We have therefore started to compile a glossary to remedy this situation.

Summary

We have talked about what we mean by IRL and Index Vocabulary; we have talked about degrees of structuring, and in what circumstances one should or need not become deeply involved in structuring; we have talked about the extent to which project FAIR has (or has not, depending on how you look at it) used structuring, and the problems encountered.

Our philosophy has been to avoid investing in sophisticated structuring until we have proof that it is necessary, and then to get involved only to the extent justified by the circumstances. We feel that it is not the job of an information centre to produce a thesaurus for its field, so much as to organize its system to be as efficient as necessary—in other words, to find the appropriate compromise between economy and the ideals of maximized recall and relevance which underlie the production of a thesaurus.

FURTHER READING

1 MANDERSLOOT, W. G. B., DOUGLAS, E. M. B. *and* SPICER, N. Thesaurus Control—the selection, grouping and cross-referencing of terms for inclusion in a co-ordinate index word list. *Journal of the American Society for Information Science*, 21, 1, January/February 1970, p. 49–57.

2 COOPER, W. S. Is interindexer consistency a hobgoblin? *American Documentation*, 20, 3, July 1969, p. 268–78.

DISCUSSION

MRS A. PATTISON (Wiggins Teape) pointed out that a co-ordinate index was generally able to say 'No' with conviction so that one did not continue searching for information that was not there. She asked if this still applied to an unstructured indexing language. MR PICKFORD thought that if one had this confidence it probably need not be reduced by the fact of using an unstructured IRL, provided one made as sure as possible that one had used all the appropriate descriptors, in spite of the absence of a guide such as would be provided by a thesaurus. One could still index in depth with an unstructured IRL, and provided care had been taken to minimize synonymity of the descriptors, he felt that confidence in a relatively unstructured system could be retained.

MISS M. KING (University of Birmingham) enquired about the incorporation of 'promoted' and 'demoted' descriptors into the users' already existing index of descriptors. MR PICKFORD replied that in any one issue of project FAIR's publication, IRBEL, the IRL consisted of the main and trigraph descriptors used to index that particular issue only. This resulted in the user having to check in the main and trigraph sections of the IRL for a favourite descriptor. Incorporation, in the sense of cumulation did not, therefore, occur in the users' IRL, but the thesaurus used for indexing did consist of all the descriptors used in all the issues of IRBEL.

MR C. KNIGHT (Bath University Library) asked why each issue of IRBEL consisted of 640 references. MR PICKFORD explained that in the first place 640 references at 10 to the page meant 64 pages. These in turn could be photoreduced by a linear reduction of 2:1 (i.e. four pages onto one) to give 16 pages of 40 references each. In the second place, since the feature cards were 80 column cards, and since 14 characters (at least) had to be allocated for the card title, the capacity of the card was reduced from 800 to 660 locations. A further two columns were used to space the feature field from the title field of the card, which reduced the capacity to 640 locations (64 columns × 10 rows). To issue each IRBEL with 640 references meant, therefore, (a) 16 pages of references and (b) a fully utilized capacity of 640 locations on the feature cards.

MR BRISTOW (British Oxygen Company) was concerned about the false drops when using trigraph codes. MR PICKFORD admitted that the inescapable conclusion to be drawn from investigating the mathematics of trigraph codes was that about 60 per cent of retrievals, using the codes only, were irrelevant. In practice, however, the false drops virtually disappeared when the three cards of the trigraph codes were co-ordinated with a main term pertinent to the search topic.

DR H. H. NEVILLE (Building Research Station) said that the effect of structure in economizing in the number of descriptions used in the system was clearly important in a system in which the feature cards were reproduced in large numbers, but in the more common type of system which existed in just one copy, economy of descriptors was less important than economy of indexing effort. Many systems operated with a high input cost in relation to a small amount of searching. It may then be more economical to take advantage of the simpler indexing technique required with a comparatively unstructured system, and devote more effort at the searching stage. MR PICKFORD felt that this opinion reinforced his conviction that systems analysis should be used to help determine the amount of structuring needed.

MR JOLLEY (J. L. Jolley & Partners) asked how the descriptors used by project FAIR were chosen in the first place. MR PICKFORD referred to his paper: 'An objective method for the generation of an information retrieval language', *Information Scientist*, 2, 1, March 1968, p. 17–37.

MR R. A. NIGHTINGALE (BP Trading Ltd) asked for further details about the use of columns 67 to 80 inclusive on the IRBEL feature cards. MR PICKFORD explained that to save collation of the mass-produced feature cards into packs, the titles of the cards were punched in columns 67 to 80, so that complete packs could be reproduced and interpreted by machine. The time spent in putting titles onto cards other than automatically would be prohibitive. Fuller details were given in: '80 column cards as feature cards', *Information Scientist*, 3, 2, July 1969, p. 69–79.

MR R. T. ADKINS (ICI Plastics, Welwyn) thought that biomedical engineering sounded like a relatively compact subject field and, if so, that it would not make much difference if the retrieval language was structured or not. With a wider subject field one would expect to have problems with homonyms. He asked whether this had been the case in project FAIR. MR PICKFORD replied that biomedical engineering was not as compact a field as it sounded, being both multi- and inter-disciplinary. There had been problems with homonyms, but the real point of interest here was Mr Adkins's implied opinion that there was a relationship between the degree of compactness of a subject area and the degree of structure needed for an IRL.

MR A. L. KING (The British Hydromechanics RA) wondered whether the conscientious indexer would spend more time searching about in an unstructured system to find the terms appropriate to the topic to be indexed, than would the user of a system facilitating direct reference to the terms required. MR PICKFORD said the project FAIR experience was that indexing with a partly structured IRL was taking about ten minutes per article, to which nine descriptors were allocated on average. He added that if indexing consistency was important, then a thesaurus or high degree of structuring was necessary.

MR P. H. SCOTT (BP) pursued the topic of indexing consistency. He asked if this depended on whether the enquirers wanted *all* the information on topic X, or only, say, one reference. If they only wanted one reference, it would not matter if one indexer called this X and the other Y, but if they wanted all the references they would look under X only and miss those indexed under Y. MR PICKFORD replied that the more common kind of enquiry in many information services was the 'I want a few references to get me started on this topic' type. The 'I want it all' and 'Have you anything?' types still had to be catered for, however, and this would have to be borne in mind when deciding how much to structure an IRL.

STRUCTURED THESAURI

JOHN BLAGDEN

McKinsey & Co. Inc.
(formerly British Institute of Management)

Paper presented at a one-day Seminar of the Co-ordinate Indexing Group, Birmingham, 30th June 1970

THE FIRST POINT that I would like to make about the differences between a structured and unstructured vocabulary is that the question is very much related to vocabulary size and this has certainly in the past generated a good deal of controversy in Aslib co-ordinate indexing circles. Mr Snel[1] and Mr Boyd[2] have been two of the leading advocates of a restricted vocabulary and they argue that this keeps both indexing and searching simple. They also argue that it allows for human intelligence to play a much bigger part in the search process by allowing the sifting of search output to be done by the inquirer and not the system. It is also assumed, probably correctly, that the bigger the vocabulary the more noise a system will produce. The reason that I believe that the question of structured vocabularies and vocabulary's size are related is simply that if one does employ structure, i.e. a classificatory element of some sort, then the practical result of this is a bigger vocabulary. May I interject with a quotation from Cyril Cleverdon, who, to my way of thinking, summed up the question of vocabulary size in a conference that the Co-ordinate Indexing Group organized some considerable while ago: 'Much of the disagreement has been due to the fact that speakers were arguing from different view points. If it was found that a particular system operated satisfactorily for a certain organization, then obviously there was no need to find fault with it. However, it was unjustifiable to make claim as speakers had done that the same system would necessarily operate satisfactorily in all other situations. There were obvious differences when one organization was more interested in having a good recall ratio and was relatively unconcerned about relevance, whilst another organization was more interested in having a good relevance ratio. Certain indexing devices were available which could bring about either of these situations but it was unlikely that any of the operating systems discussed would satisfactorily meet both requirements.'[3]

This leads me on to my next point, again taken from Cyril Cleverdon's research. (Figure 1 is taken from the article by Cleverdon in the March 1970 issue of the *Journal of Documentation*, p. 55–67, entitled 'Evaluation tests of information retrieval systems', and is reproduced here by permission of the author.) Basically the Cleverdon premise is that there is an inverse relationship between recall and relevance and that a system can be designed to either achieve high relevance and low recall or high recall and low relevance. I would like to add a rider to this and state that this statement is valid for a single search situation. With a structured vocabulary with inbuilt generics, it is a fairly simple matter to broaden the search by moving up the generic chain, thereby improving

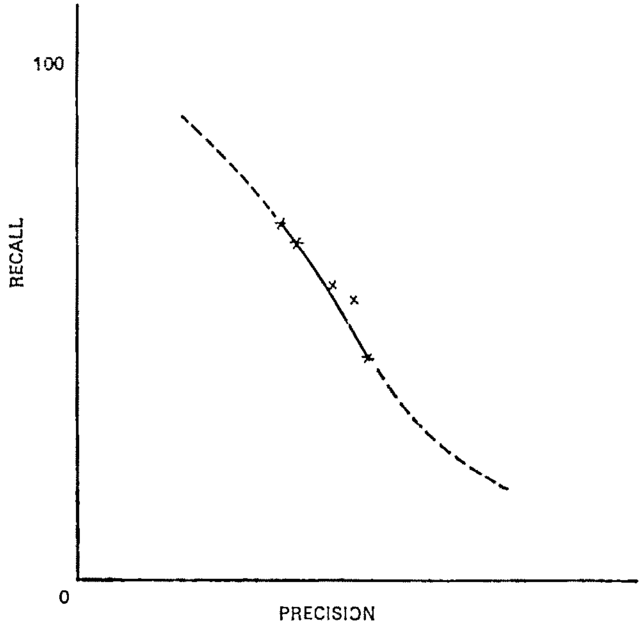

FIG. 1

recall at the expense of relevance. Of course, with any system, including the one described by Dr Pickford, it is possible to broaden the search but not usually in a generic way but simply by using different, or fewer, combinations of feature cards or whatever soft-ware is being employed. The system we have designed at BIM is one which enables the user to search both specifically or broadly or with a mixture of broad and specific terms. With the unstructured vocabulary it does often mean that one can only search broadly and here I am begging the question somewhat, as I am making no attempt to define 'broad' and 'specific' and merely let those terms be defined by the audience in the context of their own systems. Before I go any further, let me re-emphasize the Cleverdon quotation and say that I am all for pragmatism and if an unstructured vocabulary works within your organization then there the argument rests.

Now to turn to the British Institute of Managements' situation, almost all of you here today will have applied co-ordinate indexing to scientific and technical information and you may be interested, therefore, in some of our difficulties in applying this technique to such a soft language as Management. First, there is the tremendous problem of semantics. How long is 'long range planning'? What does 'management development' embrace? We have recently established in the Institute a Centre for Physical Distribution Management and this is the definition that our PDM expert has produced: 'PDM is that part of management responsible for the design, administration and operation of systems to control the movement and storage of raw materials and processed goods. The PDM's function starts with the movement of raw materials from the source of supply to the production line and ends with the movement of finished products from the end of the production line to the consumer; it includes material handling, freight transportation, protective packaging, warehousing, inventory control, plant and warehouse site selection, communications and data processing.' If we interpreted this literally, it would virtually mean that all items that we are currently recording would be included under this gigantic umbrella. Experts, therefore, tend to inflate both the importance and area covered by their speciality and, although I realize that this problem is not peculiar to management, it is certainly more prevalent here than in other fields. It is also, of course, more difficult to make clear-cut distinctions as to where production ends and marketing begins. The vocabulary that we have produced includes, I consider, more scope notes than one would find in the average thesaurus (if there is such a thing), and we also make reference to a number of other glossaries which have also been used to provide definitions. Incidentally, an excellent tool which cuts through most of the dreadful jargon that management generates, is a book by Johannsen and Robertson entitled *A Management Glossary*. The definitions that we quote in our vocabulary are not intended to be academically authoritative but merely reflect both usage in literature and the way in which we have anticipated enquirers asking questions. It is important too not to build into the vocabulary distinctions that, although academically defensible, only make indexing unnecessarily complex. For example, we simply use in the thesaurus, the terms 'small companies', 'medium sized companies' and 'large companies' without any definition. Now if we were to state in our vocabulary that companies under one million turnover were to be treated as 'small' then it would mean that turnover figures would have to be ascertained for each company recorded. Also, some people would argue that this is not necessarily a true measure of size anyway. Generics too are not mandatory as they are in technical vocabularies; gold is always a precious metal but, although stock control is usually concerned with the control of inventories at the production point, we do also have information on stock control in supermarkets which, clearly, has nothing to do with production management. We also have problem terms like 'management services,' which we allow to be defined by the literature or whatever the input form happens to be. Management services, as you probably all know, is an internal consultancy service with a wide variety of definitions from company to company. Some companies include the personnel function, market research, research and development, computers, work study, while others merely restrict the service to one or more of these services. It would be very unhelpful to the enquirer if, when we were searching for information on the concept of management services, he also retrieved all the other topics that I have just mentioned. Here then is an example of the unstructured vocabulary and, although I am giving this paper because we, as an organization, use a structured vocabulary, it would be misleading if I gave the impression that we did so throughout our vocabulary.

We did conduct a test on our system in 1969, similar to the one that I used on a metallurgical vocabulary some time ago. This was basically an attempt to monitor the system by ascertaining the amount of noise generated per search and we find that there was a much higher incidence of single subject searches than we had first anticipated, which, to some extent, nullifies some of the advantages of switching to a post co-ordinating indexing system. The number of documents indexed at the time of the test was relatively modest, some 2,300, but we did find that the average amount of noise per search was in the region of 37 per cent, which was close to the 33 per cent figure that the metals test produced, although, of course, this was based on a much bigger document collection. So, perhaps management as a language is not as soft as we initially thought. The results of this test will appear in the second edition of the thesaurus which will appear early in 1971. One of the major criticisms of the first edition was that it lacked a classified key and we have also produced one for the next edition. As alphabetical order is not the most helpful, especially with the structured vocabulary, this should improve both the quality of indexing and the searching.

The system has been applied to periodical literature initially and is now being used within one of our specialist information units, the Management Consulting Services Information Bureau, to index user assessment reports on management consultants.

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DISCUSSION

MR K. P. JONES (NRPRA) said that there seemed to be several advantages of post co-ordinate indexing even for single subject searches and all of these were connected with the flexibility of the system. It was possible to change the title of any concept simply by changing the title on one card. It was a simple process to fracture existing terms, or combine two or more terms on one card. Even if the bulk of searches only employed singles terms, the advantages of potential post co-ordination remained. Mr Jones also commented on the high manpower costs (both managerial and clerical) involved in factoring and emphasized the low costs of cards in relation to staff costs. He suggested that ordinary filing cabinets instead of purpose-built tubs should be used where possible.

MR BLAGDEN said that the thesaurus was akin to the management plan and the indexer, i.e. the subordinate, simply reports those items exceptional (i.e. management by exception). The librarian would only then discuss with the indexer those concepts not catered for by the thesaurus. When the thesaurus was developed he sometimes 'heretically' considered delegating indexing to clerical staff since 80 per cent of the decisions should not involve professional expertise.

MR KNIGHT (Bath University Library) said that with reference to the work of Chemical Science Information Unit—which gave 50 per cent retrieval with 'crude' subject indexing depending largely only on keywords in titles—this was also true of the Biological Abstracts Previews' personalized current awareness service which was basically similar to the Chemical Services (CBAC, CT, etc.) but with rather different refinements.

MR BLAGDEN warned that reindexing was expensive, especially in making one's language more specific. It was, therefore, worth indexing specifically from the start, especially if one employed a classificatory element which enabled searches to be broadened easily.

ELIZABETH BROADHURST (Urwick Orr and Partners Ltd) said that, as a user, of a post co-ordinate feature card indexing system for reports, she wished to 'hand out bouquets' to Mr Jolley and Mr Blagden for their assistance with her company's system. They were using, and were happy with their experience with (1) coding system devised by Mr Jolley for descriptive information about reports, i.e. type of company, date, author, location, etc., and (2) Mr Blagden's thesaurus for the subject content; they were, of course, adding terms to this to suit their particular needs.

MR A. G. A. PICKFORD (Project FAIR) asked if the thesaurus was available. MR BLAGDEN said that it was and that an OSTI grant had been made available for the development and publication of the vocabulary.

MISS HELEN TOWNLEY (Wellcome Foundation) said that the homogeneity of the collection (e.g. multi- or single-discipline) affected decisions on the degree of structuring required. She suggested that the degree of homogeneity of content, even in a limited-discipline collection, also affected these decisions. MR BLAGDEN replied that both the type of input, and the type of enquiry, had an effect on the system.

MR LEO JOLLEY (J. L. Jolley & Partners) asked Mr Blagden if, in developing the second edition of the BIM thesaurus, he would also ask help from users as to additional terms. MR BLAGDEN replied that there were almost twenty known users and most of them had passed on their criticisms to him. The test had introduced users indirectly, via one hundred enquiries, and he had measured the effectiveness of the system in answering these.

MRS A. PATTISON (Wiggins Teape) asked what the advantages and disadvantages of semantic factoring were. MR BLAGDEN replied that if one came across a new concept or—what happened in management more often—a new label for an old concept, then there were three choices: (1) ignore, i.e. make reference to an already authorized term; (2) factor; (3) create a new term. If one factored using existing concepts within the thesaurus this reduced the number of cards required but increased the number of holes. Before finally deciding on a factor combination, one should always make sure that, when this combination of cards was searched, it did not produce irrelevant information; in other words, if the combination gave a 'nothing' answer then it was worth employing. It was worth creating a new term if indexing, punching and searching were simplified as a result. This, of course, was then linked to the question of vocabulary size which had already been mentioned.

Letters to the Editor

Dear Sir,

PHOTOCOPIES V. PERIODICALS

In his letter (*Aslib Proc.* January 1971) Mr Cleverdon suggests that when, in discussing the cost of effectiveness of acquiring periodicals for a special library,[1] I advocated the wider use of *photocopying*, I really meant *borrowing*. Actually, by *photocopying* I meant *photocopying*, though of course I have nothing against *borrowing* whenever the borrowing of a periodical issue is more economic than acquiring a photocopy of a paper in it.

Mr Cleverdon also fears that extension of photocopying on the scale I recommend would financially embarrass the publishers of some of the periodicals now available, and deplores this possibility because they would have to raise their prices.

It is a strange inversion of received economic policies, especially in someone who has given constructive thought to improving the cost-effectiveness of information retrieval, to suggest that careful shopping when buying periodicals will increase the price of all periodicals. Mr Cleverdon seems to be suggesting that *all* periodicals now published, and all the new ones emerging day by day, are worth their cost to any library that acquires them. Are they? May I refer him to a recent paper by two 'users'—Panton and Reuben[2]—from which I quote: 'we consider it proved that the marginal value of many chemistry journals to a given university is virtually zero.'?

My personal view is that the so-called 'information explosion' in science is largely a 'periodical-publishing explosion'—and little more—which artificially increases the complexities and therefore unnecessarily inflates the costs of all information work.

Yours faithfully,

B. C. BROOKES

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University College London,
Gower Street,
London WC1.

22nd January 1971

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Dear Sir,

MANAGEMENT INFORMATION SERVICES

Mr Blagden[1] has been gracious in 'not basically disagreeing' with the points made by Messrs Landau and Bakewell. It does appear from his 'defence', however, that the ghost of 'comprehensiveness' in management literature (which also haunted the Manchester Business School report[2]) is still with us, and I really think the time has come to dispose of it.

I still cannot accept the statement that 'ANBAR should not be used if a comprehensive set of references on a topic is required'; only if comprehensiveness is equated with repetition can this statement be justified. Management writing today consists of a strictly limited number of original thoughts which are repeated, in various disguises, again and again and again. Indiscriminate listing of everything that is published, however unoriginal, however repetitive, however plagiarized, and regardless of quality, would in our view produce a useless, misleading, and dangerous tool.

It would be much easier to produce such a service. There would be no need, then, to employ subject specialists, highly trained practical people, to do our abstracting and indexing. We could employ young girls who would copy out what hit them in the eye, and that would usually be the platitudes and the unsupported claims.

As it is, we prefer to peruse, abstract from, and index, a limited list of journals. We do not claim that we get everything from the horse's mouth that way, but we think we miss nothing that matters.

This policy results in a number of things which do not take us towards Mr Blagden's comprehensiveness, and which do not produce the *longest* journal list. Producing a long journal list is, in fact, very easy: you simply put on it every title that has (or appears to have) some remote connection with the field you cover. If a title contains nothing you are ever likely to abstract, so much the better. ANBAR, on the other hand, takes a close look at a publication before it is admitted; on occasions refuses requests from editors to include titles; and crosses off titles that deteriorate and cease to make a contribution.

I am a little unhappy about Mr Blagden's statement that 'there are in existence well over 500 management journals according to the latest BIM list, whilst ANBAR covers about half that number'. I know the next sentence ('comprehensiveness is in practice rarely required') qualifies this, but I still think it is a careless statement to make. Mr Blagden's '500' is, presumably, the number of titles in BIM's *Library Periodical Holdings* list, of which I have before me, as I write, an out-of-date edition; I do not expect that this affects my argument. The list includes the *Journal of the Amalgamated Engineering Union*, the *Bulletin of the Oxford University Institute of Economics and Statistics*, *The Graduate Appointments Register Salary Survey*, *Graphs and Notes on the Economic Situation in the (European) Community*, *Labour News from the United States*, etc, etc, all of which may be needed in the BIM Library, but few of which would be listed under 'management journals' in any responsible catalogue.

The list also includes *The Times*, *Which?*, the *Investors Chronicle*, and *The Grocer*; a substantial number of abstracting, indexing and similar services which hardly qualify in the present context; and a necessarily limited selection of foreign language titles, for every one of which one could name a dozen with claims as good but not on the list.

The figure 500 is, thus, meaningless unless there is some definition of the term 'management journal', and of the languages/countries covered.

ANBAR's list may have broken through the 200 mark by the time this letter is read. We are continuing to watch for new (and old) titles deserving inclusion; at all times grateful for suggestions from subscribers and other users, we see in the small number we receive an indication that our choice is widely approved.

Yours faithfully,

H. P. CEMACH
Managing Editor

Anbar Publications Ltd,
P. O. Box 23,
Wembley HA9 8DJ.

22nd January 1971

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CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

Note: These categories have been revised since the December 1969 list.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

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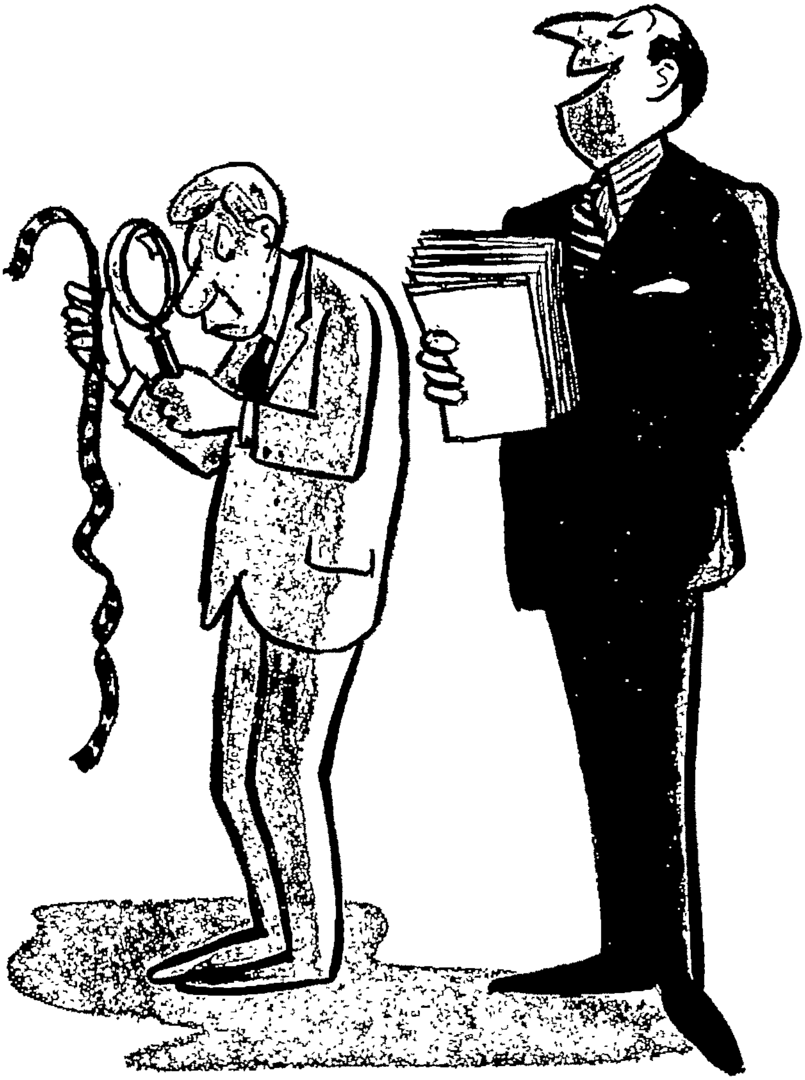

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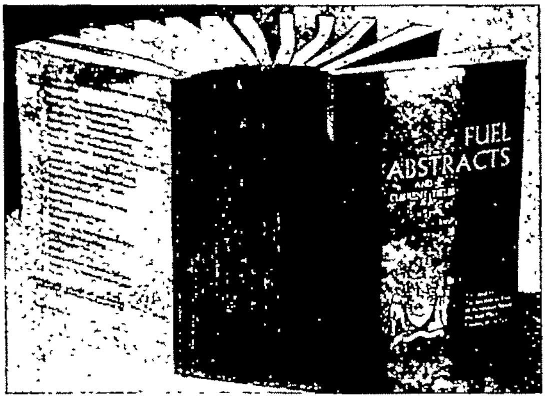

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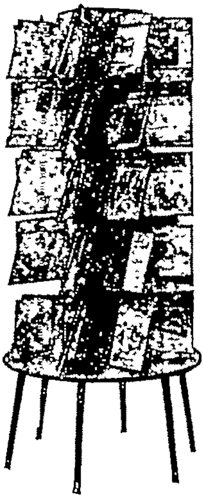

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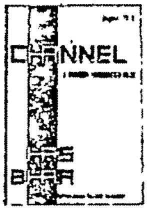

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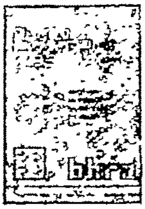

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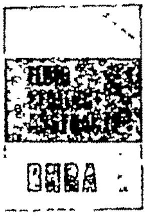

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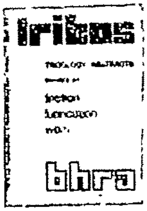

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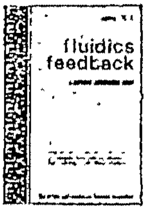

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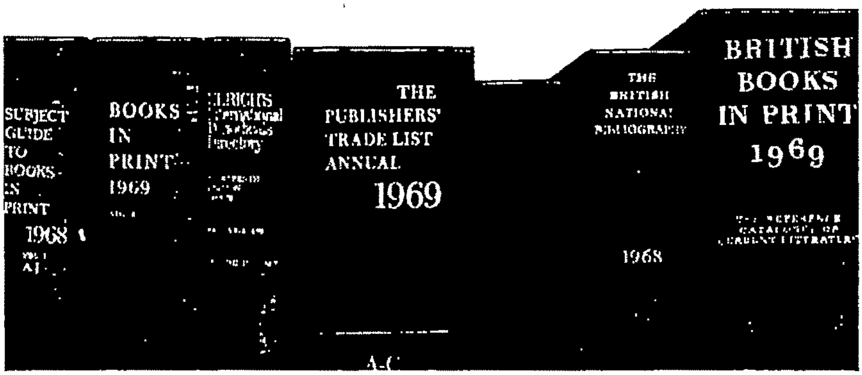
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CENTRAL LIBRARY UNIVERSITY

ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 23 April 1971 Number 4

ASLIB CALENDAR 1971

April

THU.29–SAT.1.	Midlands/Northern Branch Joint Conference. Royal Cambridge Hotel, Cambridge.

May

THU.13.	Aslib visit to NRLSI, Bayswater Division, London W2. 4.30 p.m.
FRI.14.	Biological Group visit to Biodeterioration Centre, Aston, Birmingham.
MON.17.	Co-ordinate Indexing Group meeting and lecture. Aslib. 3.30 p.m.
WED.19.	Aslib Evening Meeting. 'Mass-Observation archive at Sussex University', by Mr Tom Harrisson. Imperial College, London. 5 for 5.30 p.m.

June

TUE.1.	Social Sciences Group evening meeting and lecture: 'The INFROSS Project', by M. B. Line. Aslib. 5 for 5.30 p.m.
WED.9.	Aslib Annual General Meeting. Aslib. 5th Aslib Annual Lecture. 'Words and documents', by Dr H. Coblans. Senate House, London University. 6 p.m.
MON.14.	Co-ordinate Indexing Group meeting and lecture. Aslib. 3.30 p.m.
WED.16.	Aslib One-Day Symposium: Problems of using external information services. Royal Aeronautical Society, Hamilton Place, W1.

July

FRI.9–SUN.11.	Electronics Group 13th Annual Conference. Churchill College, Cambridge.
FRI.23–SUN.25.	Aeronautical Group Annual Conference. Cranfield Institute of Technology.

October

SUN.10–THU.14.	Aslib 45th Annual Conference. Darmstadt, W. Germany.

Fifth Aslib Annual Lecture

Aslib's fifth Annual Lecturer will be Dr Herbert Coblans, an internationally respected figure in the library and documentation field. He will be well known to many members of Aslib as the Managing Editor of the *Journal of Documentation* and as a former member of the staff of Aslib.

Originally a South African graduate in physical chemistry, Dr Coblans lectured in that subject at the University of Natal. He subsequently qualified as a librarian and directed the Unesco Library in Paris (1949–50). His association with the Fédération Internationale de Documentation dates from this period. From 1957 he was a member of the Editorial Board of the *Revue Internationale de la Documentation*, and later became Editor during the last four years of its existence. In 1954 he organized the Scientific Information Service of the European Organization for Nuclear Research (CERN) in Geneva and remained its Head for ten years until he joined the Research Department of Aslib. In 1968 he led a team at the International Atomic Energy Agency (on secondment) in Vienna in the planning of an International Nuclear Information System (INIS). He retired in 1969 but has carried on as Managing Editor of the *Journal of Documentation.*

Entitled 'Words and Documents', the Annual Lecture will be delivered at the William Beveridge Hall, Senate House, University of London, at 6 p.m. on Wednesday, 9th June 1971. The following is an abstract of the paper Dr Coblans will present:

Our stock-in-trade is basically simple—words packaged in documents. These documents are stored in libraries and it is by the quality of the description of their contents that they are made usable. At the lowest level that description is in natural language and as the demands of communication widen, so identification must become more standardized, approximating to a meta-language as used in indexing and classification. The history of documentation consists of swings of the pendulum in relation to how much intellectual effort must be applied to recognize patterns of order and thus to ensure efficient retrieval.

Natural language should not and cannot be standardized. There is no satisfactory Esperanto for the transfer of information contained in documents. There are only rather crude approximations: alphabetical subject terms, hierarchical classifications, intermediate switching languages. At present, we are moving into a phase where research and some practice point to free text searching as an economic solution, which is made possible by computer processing. The assumption is that the words of a title or an abstract have enough information content to differentiate documents in response to user needs. This, like the machine translation of natural languages, is probably a false god. Actually it is computational linguistics which has made us more aware than ever before, that natural language, its comprehension and use, is so variable, rich and infinitely flexible, that the algorithms of computer programming just cannot keep pace with the genius of creative language.

There are no unique or cheap panaceas, no short cuts. If scientific research and technological applications are worthwhile, then the cost of recording the results in documents and making their contents widely known are just as important as the original research. This means that within the framework of the generators and the users of documents there must be ordered documentation, a minimum of standardization, the sharing of intellectual effort and the necessary international planning.

But it is argued by those who, like McLuhan, believe that 'electronic' man is a new and revolutionary phenomenon, that these potentialities make the 'Gutenberg' world obsolescent. The traditional forms—the book, the periodical, the learned paper—are bound to wither away since the modern technology of communication (computers, TV, satellite transmission) determines the way people think and behave. 'The medium is the message'. Even if most of us

agree that McLuhan is a questionable, though admittedly seductive, prophet, it is clear that the 'media' do influence documentation, as the post-war years have shown. Nevertheless it is doubtful whether the basic interplay of words and documents will change radically in the foreseeable future. The problem is how scientific and scholarly inquiry is transformed into knowledge. As long as scientists work within the present pattern of human physiology and psychology, new technology will only modify, not revolutionize, the traditional methods of handling information.

By far the most serious danger for a sane relationship between man and the records of his work is that rapid and uncontrolled growth, that 'inexorable exponential' which leads to a machine-dominated civilization. Somehow we must survive as the guardians of the physical documents and their interpreters, those who match the document with the user through the manipulation of words. Therefore our profession must be based on a high level of education, great integrity, and international outlook and the capacity to accept compromise in shared activity.

The Mass-Observation archive at Sussex University

The speaker at the Aslib evening meeting to be held on 19th May at Imperial College of Science and Technology, will be Mr Tom Harrisson, DSO, OBE, Director of Mass-Observation and Senior Research Associate in Anthropology and South-East Asia Program at Cornell University. The subject of his talk will be the Mass-Observation's archive which has come to rest at Sussex University.

The name of Tom Harrisson is irrevocably linked with Sarawak: he led an Oxford University Expedition to Central Borneo before he was twenty-five; he was the first man to be parachuted into Borneo to organize guerillas in Sarawak and Dutch Borneo before the Allied landing (1944–5); and he was Curator of the Sarawak Museum from 1947 to 1966.

He might have called his lecture to Aslib 'Head hunters at home', for he claims that he came to study 'the cannibals in Britain' after living for a year among the cannibal mountain tribes of Melekula. Thus in 1938 he started with Charles Madge a new type of social research organization, called Mass-Observation. In his recording of attitudes, customs and quirks of behaviour he brought to bear the anthropologist's eye that gave us some of his best known books—*Living among cannibals*; *The people of Sarawak*; *Brunei: background to a revolt*. *War begins at home*, *People in production*, *Home propaganda* embody some of the findings of Mass-Observation in the early war years. His methods pointed the way to many of the social survey and polling techniques of today and his material is both freshly original and unique.

The Chairman of the meeting will be Mr Alec Hughes, Assistant Secretary of the British Association for the Advancement of Science. The meeting begins at 5.30 p.m. (tea 5 p.m.).

Electronics Group Conference

The 13th Electronics Group Annual Conference will be held from Friday 9th to Sunday 11th July at Churchill College, Cambridge. Transport, for those who have notified the Conference Secretary that they require it, will meet the train which leaves Liverpool Street at 16.36 and arrives at Cambridge at 17.42. The conference fee is £12, but this is reduced to £11.50 for fees paid before the end of the conference.

The programme consists of two very topical technical papers, one on holography and lasers, the other on pattern recognition. It includes a paper on the present and future of microforms in libraries and one on financing a library/information service by operating a cost recovery system. The very successful practical demonstration session inaugurated last year will be repeated, the theme being information storage and retrieval.

The Annual General Meeting of the Group on Saturday afternoon will be followed by a visit to some of the more historically interesting colleges and also to Heffer's new bookshop.

Social Sciences Group

Interest in the Group's activities, particularly attendance at meetings, has proved without doubt the truth of the proposal made some eighteen months ago that such a Group was needed. The Group's meetings have been well attended and the papers published in this issue, given at the Group's highly successful weekend conference held in Loughborough in January, exemplify the high standard of the papers which have been presented. Following the first AGM of the Group on 8th February, Mr A. F. Comfort gave an interesting and amusing paper on the compilation of a guide to government information, an SSRC project on which he is engaged. A further interesting talk was given to the Group on 15th April by Dr N. Bradburn, Director of the National Opinion Research Centre in Chicago. A meeting of the Group is also planned for 1st June at which Mr Maurice Line will talk on the results of the INFROSS project. Other suggestions being followed up are for meetings on the subjects of translations of social science materials, political science records, newspapers, welfare information for industry, and social science terminology.

A working party of the Group has been considering methods of compiling registers of research and has now formulated guide lines to assist the compilers of future registers, together with a standard form for entries in research registers which it is proposed should be used, and it is expected that these will be available shortly. A working party on information services for social workers continues its work which, it is anticipated, will lead eventually to an improvement in such services.

At the end of 1970 the membership of the Group was 93 (34 national, university and college libraries, 23 industrial firms, 18 societies and institutions, 11 individual members, and 7 government departments). Members of Aslib are reminded that membership of Groups is not automatic; there is no additional subscription for Group membership, but to be advised of meetings and other activities of the Social Sciences Group they must advise Aslib Headquarters of their interest in the Group.

Center of Scientific and Technological Information, Tel-Aviv

As announced in the June 1970 issue, the Center of Scientific and Technological Information in Tel-Aviv is currently conducting a one-year course in information science for postgraduate students. Among recent visiting lecturers on the course have been Mr Felix Liebesny, Chairman of the Aslib Council, who gave a series of lectures on sources of information; Dr D. V. Arnold of ICI and a former member of the Aslib Council, who lectured on information in industry; and Dr D. J. Campbell, also a Council member, who spoke on classification.

While in Israel Mr Liebesny also visited Tel-Aviv University and the Haifa Technion where he gave talks on Aslib and its activities.

R. S. Hutton Collection at the City University

The Skinners' Library of The City University has been presented by Mrs S. M. Hutton with the personal library of the late Professor R. S. Hutton, first Goldsmiths' Professor of Metallurgy at Cambridge University and a principal founder of Aslib.

The collection contains over one thousand items, ranging over the interests of Professor Hutton's successive appointments, from his lectureship in electrometallurgy at Manchester University in 1900 to the Chair in Cambridge which he held from 1931 to 1942. It also covers his period as Director of the British Non-Ferrous Metals Research Association and it was during this time that he helped to found Aslib in 1924.

The City University is therefore a particularly appropriate recipient of his collection since it contains the country's first Centre for Information Science, the work of which is closely related to the objectives and interests for which Aslib was founded, and for which Professor Hutton worked energetically all his life.

FID/OM (Operating Machine Systems)

The Council of the International Federation for Documentation (FID) have confirmed that with effect from 1st April 1971, the Secretariat of the FID/OM study committee has been transferred from West Germany to Aslib. Mr D. H. Barlow of INSPEC has been nominated as Secretary.

Mr Leslie Patrick

Mr Leslie Patrick of the College of Librarianship, Wales, and a former Chairman of the Aslib Council, has recently agreed to serve as the British representative to the FID's study committee on developing countries (FID/DC).

Courses on book indexing

An introductory course on book indexing for persons with no, or little, experience is to be held at the Willesden College of Technology from 28th June to 1st July. An advanced course for experienced indexers has also been arranged; this will take place from 21st to 24th June.

Both courses have been arranged by the Society of Indexers in conjunction with the Willesden College of Technology.

Particulars of both courses can be obtained from: The Director, Book Indexing Courses, c/o Department of Liberal Studies, Willesden College of Technology, Denzil Road, London, NW10 2XD; or The Editor, *The Indexer*, 41 Milton Road, Harpenden, Herts. Stamped and addressed foolscap envelopes should be enclosed with requests for particulars.

Curator or Informaticist

At a meeting of the Library Education Group of the Library Association, to be held at the LA on 18th May 1971, Mr D. J. Foskett, Librarian of the London University Institute of Education, and Chairman of the LA Education Committee, will speak on the subject 'Curator or Informaticist'—another look at the degree of concord between the disciplines of librarianship and information work.

Mr Foskett's interest in this topic is of several years' standing: for his latest contribution on the subject, see his article, entitled 'Informatics', in the December 1970 issue of the *Journal of Documentation.*

The meeting begins at 6 p.m. and all are welcome.

Reference book awards

Two new awards—designed to acknowledge excellence in reference books—have been established by the Library Association. One will be for a reference book and the other for a bibliography.

The first is to be named after Mr Lionel McColvin, former Librarian of Westminster and an outstanding figure in the field of public librarianship, and the second after Mr Theodore Besterman, internationally known as a bibliographer. Both Mr McColvin and Mr Besterman are Honorary Fellows of the Library Association.

The awards will be made annually for books first published in the United Kingdom. Among the qualifications for them will be the authority of the work and the quality and kind of its articles or entries, the accessibility and the arrangement of the information; its scope and coverage; relevance and quality of illustration; quality of the indexing; adequacy of the bibliographies and references; the up-to-dateness of the information; the physical presentation; and the originality of the work.

The types of work eligible for the McColvin Medal will include encyclopaedias and dictionaries; bibliographical dictionaries; annuals; year books and directories; handbooks and compendia or data; and atlases. The Besterman Medal will be awarded for an outstanding bibliography or guide to the literature.

For further information contact Michael Yelland, Research Officer, the Library Association, 7 Ridgmount Street, London WC1.

International Symposium on 'Management and Innovation'

ISC International Management of St Gallen, Switzerland, are organizing an international symposium on the subject of 'Management and Innovation', to be held at the St Gall Graduate School of Economics and Business Administration from 24th to 26th May 1971. The symposium is being held under the auspices of the Swiss Minister of the Economy and five other European Economic Ministers.

Eleven speakers from eight different countries, including senior executives from well-known companies, as well as distinguished academics in the field of management and business studies, will discuss such subjects as: 'Innovation and commerce'; 'Innovative management in industry'; 'Computers and innovation'; and 'Co-operation between industry and scientific institutes for the promotion of innovation'. Panel discussions will take place, and working parties set up, to consider the topics being discussed on each particular day. Coverage of the conference is also being planned by the news media from a number of countries.

For further details contact: Wolfgang Schuerer, MBA, President, ISC International Management, POB 706, CH-9001 St Gallen, Switzerland.

BRIEF REVIEWS

BAHR, HOWARD M. *ed.* Disaffiliated man: essays and bibliography on skid row, vagrancy, and outsiders. Toronto, University Press; London, OUP, 1971. 428 pp. £4.50 (SBN 8020 1613 8)

The first quarter of this book consists of five introductory essays, some dealing with skid row and its men, and others treating more common forms of disaffiliation, such as widowhood and religious defection. These essays, each written by an expert in the field, are designed to introduce the bibliography which follows, summarize certain aspects of the literature, and point to research opportunities.

The annotated bibliography, which forms the bulk of the book, is intended to facilitate access to the extensive literature on social disaffiliation which is often 'lost' in the literature of various other disciplines, e.g. sociology, psychology, law, gerontology, urban planning, and medicine. A number of subject headings are used in the bibliography, such as 'Taverns and bars', 'The law', 'Journalistic and literary accounts', 'Employment and unemployment', and each section in turn covers 'books', 'articles' and 'other works'. The annotations give information about the author's general thesis and conclusions; for works reporting empirical research, the annotation identifies the problem studied, the research site, sample size, methods applied, and major findings. Unpublished works not available in English are usually annotated in greater detail. Most studies cited were conducted in the USA, but studies from other national settings, including a number from Britain, are also included.

This work should be a valuable tool to social workers and others involved in the increasingly complex and varied problems associated with the disaffiliated in modern society.

CLARK, *Sir* FIFE. The Central Office of Information. London, Allen & Unwin, 1970. 184 pp. £2.50. *New Whitehall Series No. 15* (prepared under the auspices of The Royal Institute of Public Administration). (ISBN 0 04 351035 3)

Written by the Director-General of the COI for the last sixteen years, this book is a thorough and authoritative account of the functions and responsibilities of this non-ministerial government department.

The author traces the development of government information services from before the First World War up to the establishment of the Ministry of Information in 1939, out of which grew the COI itself in 1946. The various services which the COI provides are then fully described: for example, the Overseas Press Services, which provide press material on British affairs to British embassies and High Commissions throughout the world; publications, reference and radio services; film, television and photographic material used to inform the public on such matters as safety and health, to encourage recruitment to public services, and generally to disseminate information throughout the world on all aspects of British policy and achievements. Other chapters include: a description of the management of an advertising campaign (e.g. on the recent conversion to decimal currency, the success of which has depended largely on the effectiveness of the publicity being carried out by the COI since 1967); promoting British publications abroad; and an interesting account of the COI's role in the design and production of the British pavilions at the Brussels, Montreal and Osaka World Fairs.

'Presentation of purely factual material without commentary or colourful writing, in such a way that the facts tell their own story', is the style which predominates through most of this work. A final chapter, however, is devoted to more general commentary and reflections. Particular emphasis is placed on the fact that the COI is *not* a propaganda instrument for use by the party in power, and the chapter outlines the conventions which have been established to prevent this from happening. It may perhaps have been more suitable if, because of its implications, this point had been made quite clear to the reader in the introduction to, rather than as a conclusion of, the 'purely factual material'. Otherwise, this is an extremely useful, and welcome, addition to this series.

GRAY, LIONEL F. *ed.* Jane's major companies of Europe: 1971 edition. London, Sampson Low, Marston, 1970. Various paging. £15. (SBN 354 000 73 x)

The second edition of this work to be published under this title has recently appeared: it was formerly Beerman's *Financial Yearbook of Europe.* The companies included are arranged alphabetically under their main subject field of interest. The entry for each company now begins at the head of a page which makes the information given clearer. However, this new arrangement has meant a considerable expansion in the number of pages in the volume which has necessitated the omission of the tables of statistics and information on taxation.

The details given for each company include the address, names of directors, subsidiary companies, capital, and information from the accounts for each of the last five years up to and including 1969. Forty-five companies appear for the first time in this edition. There is an alphabetical index of companies and an index under country of domicile. A glossary of financial terms shows the equivalent of English words in ten languages.

WHO OWNS WHOM (Continental edition). Vols. 1 & 2: a directory of parent, associate and subsidiary companies, 1970/71. 10th edition. London, Roskill, 1971. Various paging. £10 *each vol.*; £16 *set.*

Once again the Continental edition of *Who Owns Whom* is in two volumes, with the same arrangement as the 1969/70 edition. It departs from previous years, however, in the extended coverage given to tax-haven countries, beginning with Luxembourg and Switzerland, and it is intended to cover the other major countries in a similar way in future editions.

The directory now lists some 90,000 parent and subsidiary companies and has been increased as a whole by about 15 per cent. The introduction in particular should not be overlooked since it provides useful information and statistics on the European company, mergers, the EEC and Britain, and other aspects of business in Europe.

WITTKOWSKI, ADOLF. Die Internationalen Wirtschaftsorganisationen im Schrifttum. Teil 1: Allgemeines Schrifttum—Atlantik-Charta—Vereinte Nationen. Kiel, Institut für Weltwirtschaft, 1969. 426 pp. *DM*39.50.

This is the first of several volumes to be published in a series on the literatuie of international economic organizations. The contents of this volume include general bibliographies and sections on the Atlantic Charter, the United Nations and its various Economic Commissions.

Within each section the publications are listed in chronological order in the language in which they were originally published, and the entries are given running numbers through the volume. There is an index of personal names, an index of corporate bodies, and a detailed contents list in German gives the heading of each section.

This volume appears to cover its chosen subject field throughly, and should prove a useful tool of reference, although a detailed subject index might make it more usable.

ASLIB SOCIAL SCIENCES GROUP CONFERENCE ON PRIMARY MATERIALS IN THE SOCIAL SCIENCES

INTRODUCTION

From 1st to 3rd January 1971 at Loughborough University of Technology the Aslib Social Sciences Group held a Conference which had as its theme 'Primary Materials in the Social Sciences'. Over seventy librarians from national, university, government and special libraries heard papers on the needs of researchers and practitioners in six of the major subjects in the field. The speakers were Professor D. Swann of Loughborough University (economics), Professor G. S. Bain of the SSRC Industrial Relations Research Unit at Warwick University (industrial relations), Mr P. Laslett of Cambridge University (historical demography), Professor Kathleen Jones of York University (social administration), Dr M. Rush of Exeter University (politics and political science) and Mrs Brenda White of Edinburgh University (urban and regional planning). Each of them described the sources relevant to their subject, discussed problems of access and suggested ways in which provision could be improved both nationally and locally.

Three of the papers, those by Swann, Rush and White, are reprinted here. They are followed by statements made during the Conference by representatives of two of the libraries most deeply involved at the national level, Mr R. *J. Fulford of the British Museum and Mr D. A. Clarke of the British Library of Political and Economic Science. Finally, Mr M. B. Line of Bath University of Technology, Chairman of the Social Sciences Group, draws conclusions from the proceedings which could be helpful to the British Libraries Board in the formulation of a national policy for these important but often neglected materials. A preliminary note by Mr J. E. Pemberton of Warwick University, who organized the Conference, was printed in the February issue.*

The paper presented by Professor Bain is unfortunately too long for Aslib Proceedings, *but it is hoped that it will appear elsewhere. Those by Laslett and Jones are not yet available.*

PRIMARY SOURCES IN ECONOMICS

D. SWANN

Professor of Economics, Loughborough University of Technology

Paper presented at the Social Sciences Group 1st Annual Conference, Loughborough, 1st–3rd January 1971

I SHOULD begin by saying that in addressing the Social Sciences Group of Aslib I feel not only a sense of pleasure but also that I am perpetrating the act of carrying coals to Newcastle. Having said that I should add that what I have to say consists of my own personal views. They reflect my research interests which lie in the fields of industrial economics—specifically monopoly and restrictive practices policy—and international economics—specifically the European Economic Community. Let me finally put you on your guard by pointing out that it is a notorious fact that no two economists think alike on any topic.

What I have to say falls into two sections. The first relates to primary sources used by economists. This is a general review. The second deals with the subject of library organization and highlights a few problems.

Sources

It goes without saying that the main forms of primary material for economists in the UK emanate from (1) the UK government (and in Northern Ireland, Stormont) and (2) international bodies such as the UN, OECD, EEC, EFTA, IMF together with foreign governments.

If we take the UK first then the material seems to resolve itself into five main categories. Firstly there are the various statistical series and periodic releases of data. If I were to list them I would suggest that most economists would emphasize the following:

Monthly Digest of Statistics
Annual Abstract of Statistics
DEP Gazette
Financial Statistics
Trade and Navigation Accounts
National Income and Balance of Payments Data
Censuses of Production and Distribution
Board of Trade Journal
Housing Statistics
Economic Trends
Statistics on Incomes, Prices, Employment and Production

These are the publications to which economists have very frequent resort both from a teaching and research point of view. I suspect they exhaust a good deal of what the general economist (as opposed to the agricultural economist) looks for on the side of statistical series.

Secondly there are the series of reports by nationalized industries and I include such things as the *Bank of England Quarterly Bulletin* and publications by bodies such as the Forestry Commission.

Thirdly I would stress the immense importance of reports by particular official bodies such as the Monopolies Commission and the National Board for Prices and Incomes. Both this category, and the second one, are particularly valuable not so much for the provision of raw statistical data but for providing information about the structure of industries, the economic problems of their operation (i.e. the behaviour of costs) and the nature of business policy. More specifically, the Monopolies Commission reports do of course throw valuable, and privileged, light on the nature and effects of concentrated industrial structures and restrictive business practices. Likewise the NBPI has told us much about wages, earnings and payment by results in individual firms.

A contrast can, however, be drawn between the second and third categories. In respect of the nationalized sector, we are relatively well informed about the conduct of such enterprises since in addition to the reports of such bodies as the CEGB, Electricity Council, etc., we have those periodic grillings by Select Committees of the Houses of Commons. This highlights the importance of Parliamentary papers. By contrast there is a relative veil of secrecy surrounding the activities of enterprises in the private sector. This is a great drawback since although our economy is a mixed one it is predominantly private. It is for this reason that the reports of the NBPI and the Monopolies Commission (we should not forget the Restrictive Practices Court) are so valuable. It also highlights the fundamental weakness in the present primary source position and suggests a major problem which librarians and academics have yet to tackle.

There are at least three penetrations of the veil of secrecy. One is the company report and we welcome the recent increased provision of information. The latter is, however, mainly financial. This is excellent but it leaves us short of information about business policy—i.e. why do companies decide to do what they do? In this respect Chairmen's reports are not only notoriously unhelpful but positively laughable. The second penetration proceeds from the activities of trade associations. They obviously get their hands on a lot of information—particularly data on prices and outputs in a more disaggregated form than appears in government publications. Obviously the need to preserve business secrecy prohibits this data from being published immediately but it is a great pity that after the event, when it can do no competitor any good, it does not find its way into some library or central depository. After all, dated data is extremely useful when trying to understand past events and the economist must hope that if he can find patterns in past events then this will help him to understand and forecast the future. It is certainly worth considering whether trade associations would eventually deposit statistical data (I am not expecting depositions of minutes and correspondence!) in a central library provided they could be given a guarantee of restricted access by bona fide university research workers.

At this point it is perhaps worth noting that when a company is wound up, a motion is put at the last meeting that the records be destroyed. This seems to me to be most unfortunate. It is a pity that we cannot persuade our accountancy colleagues to suggest that the records be lodged in a suitable depository. Also, whilst referring to the destruction of documentary material, we should not forget local authorities who accumulate but are ultimately forced, because of space constraints, to destroy valuable data. I have found them most accommodating on the subject of access to data and I feel that they might be very willing to deposit documentary material of an economic and social kind.

The third penetration consists of the reports of stockbrokers and investment analysts. These are most enlightening, particularly as they often take the form of extremely substantial market and financial analyses of particular firms and industries. There are two problems here. Even if stockbrokers were willing to sell them to libraries (as opposed to private investors), they are extremely expensive and I doubt if libraries in general could afford to build up a collection. But there is also the problem that stockbrokers might well be hesitant to sell them to libraries, since this might be thought of as a threat to sales. The best solution might be a central depository again with only bona fide research workers—not academic investors—being allowed to consult them.

I would like to pursue the veil of secrecy problem a little further. As compared with the US we are extremely poor in the field of industrial studies and I never cease to admire the American academic output in this area. In the UK we are relatively strong on macro-economic studies—i.e. studies of inflation, general wage movements, balance of payments problems, monetary policy and the like. It seems fairly evident that we should correct this imbalance. Why it exists is difficult to say. Some part may be due to attitudes, in the sense that industrial research requires a lot of field work and British economists sometimes display a proclivity to prefer to speculate in the armchair with the aid of published and easily available data. But some of the imbalance may be due to a lack of data—it is well known that one of the prime rules in social science research is to cut the coat according to the nature of the available cloth. This weakness in industrial research is a national problem. It is well brought out in the Common Market debate. One of the main arguments in favour of entry (according to the pro-Marketeers) is that the UK market is too small to enable UK firms to enjoy to the full the economics of large-scale production. But this is largely a hypothesis since we do not know what the optimum size of the firm is and whether, and how frequently, the UK market is undersized. In a crucial area of economic policy we therefore remain in ignorance.

We can now return to the main theme. The fourth category of UK government source is extremely important. From time to time the Government decides that it is important to survey a particular field of economic policy because problems are arising and everyone feels generally ignorant about the true state of affairs. A Royal Commission is set up and in due course reports—it usually produces at the same time several appendices of evidence and studies. The celebrated examples are the Radcliffe Report on the monetary system and more recently the Donovan Report. It is difficult to stress sufficiently how much economists rely on such reports in connection with their research work, not to mention the impact they have on lecture notes.

The final category is something of a catch-all which can be termed 'Parliamentary material'. Bills, Acts, White Papers and *Hansard* are invaluable for those researching and teaching in the economic policy field and every university operating in the area of economics must have a fully comprehensive supply of them.

When considering bibliographical tools I am not too unhappy. It seems to me that the Monthly and Annual List plus the *Dictionary of National Bibliography* enable one to get to grips reasonably well. In respect of subject matter there are some problems. My impression is that some Parliamentary Committees deal with a variety of issues and it would be useful to know what committees deal with, as well as what committees produce reports.

To be frank, one of the main problems with government statistical information is its usefulness, or rather lack of it. One problem is dating. For example, the *Censuses of Production and Distribution* seem to be of little use since there is a time lag before they are available. In the case of the former a figure of approximately five years would not seem inappropriate. Another problem is aggregation. Data of the production of different products tends to get lumped together, whereas one would like output by individual products or even classes of a particular product. For example, one often does not want data on output of heavy electrical equipment but data on the production of, for instance, transformers and, moreover, one would like to know how the data for distribution, system, power and transmission transformers has behaved. It is often only at this level of disaggregation that data is of use to the industrial economist. Another problem is the lack of price data.

We now come to information provided by international bodies and foreign governments. Before we do so I would like to emphasize one point. There can be no doubt that in the future economists will be increasingly interested in this type of information. There are a variety of reasons for this. Firstly, there are more international bodies in existence producing data than once was the case. Secondly, our national sovereignty is declining. Increasingly we are members of international clubs with rules—i.e. GATT and EFTA. These clubs also tend to make pronouncements about the conduct of our national economic affairs (sometimes these are not flattering)—the OECD and IMF are cases in point. Thirdly, we are quite likely to join the Common Market. This will greatly stimulate an interest in what the EEC is and does. It will also make us much more conscious of the kinds of economic and social policies practised by member states of the EEC. Finally, there is a tendency for us to look to foreign government practice for guidance—British is no longer inevitably best. Thus, in the recent debate on trade union legislation, attention has been focused on the US 'cooling-off' system. In the field of incomes policy there is an awareness of the experience of countries such as Sweden and the Netherlands. In the field of monopolies and restrictive practices there is a very keen interest in the approaches adopted by other countries. The economics of pollution will no doubt also be a field of comparative activity in the remaining part of the present decade.

There is not enough time for me to review the use of all this material. Briefly, however, the material produced by the EFTA and EEC is particularly useful to the student of international trade. It is also immensely valuable in understanding the nature and effects of economic (and political) integration. The OECD and UN produce statistical publications which relate to the states which fall within their ambit. These deal with national trends in trade, production, prices, and so forth and readily facilitate comparison. Such international institutions also produce most valuable studies, of a comparative kind, relating to areas of economic policy such as incomes. The OECD also produces a valuable series of in-depth studies of national economies and the management thereof. The IMF produces a particularly useful series called *International Financial Statistics* which readily facilitates comparison of the banking, balance of payments, and reserve positions of various countries. National Government data is also useful for comparative purposes. Whereas international institution data tends to relate to macro matters, such as trade, prices, global industrial production, national government data is much more useful when economists are interested in national policies and more micro matters, such as the structure of individual industries. For example, if an economist wishes to establish whether UK industry has a size disadvantage when competing with foreign producers, he naturally turns to census of production data in various countries in order to compare size distributions of plants and firms.

How well supplied are our libraries with (*a*) international institution data and (*b*) national government data? With respect to (*a*), my impression is one of patchiness—most libraries tend to take some series but not the whole output of every body. Admittedly it would be expensive in space and finance if all libraries sought to take in the full range of publications. From a bibliographical point of view things are far from perfect. If one takes the EEC as an example, there is some guidance in the HMSO Monthly List but my own personal research experience clearly indicates that there is much valuable material which escapes bibliographical attention.

As far as (*b*) is concerned, it is clear that university libraries as a whole are relatively weak in this area. Given the cost this is understandable and as a result libraries are not likely to enter certain fields. This in turn does mean that there is an informational problem. For example, one of my own particular areas of interest is monopoly and restrictive practices policy. In this field the US is pre-eminent and the government and antitrust bodies produce a very considerable literature. It is far from clear to UK research workers in this field where we should go to find a comprehensive collection relating to the US. I am sure this problem arises very frequently—special collections may exist but we in a particular university do not know where they are.

Before finally leaving the subject of sources, it is worth mentioning that although the provision of data is largely a public as opposed to a private function, in the field of UK labour economics private bodies are beginning to make valuable contribution. I am thinking here of the series relating to professional earnings contained in such publications as the *Graduate Appointments Register* and the Cornmarket and Associated Industrial Consultants' Surveys.

Library organization

Each library must take the whole HMSO output—or virtually do so. This seems to be a must when a university is actively engaged in research and teaching in the field of economics. When it comes to international institutions and foreign governments, no doubt each library will want to take a selection. From a point of view of convenience, the taking of a selection of the most frequently used series seems most necessary. It does, however, also seem most desirable that there should be either a centre, or centres, which would cover the whole field of output in respect of particular institutions and governments. They should, I would suggest, cover the EEC, EFTA, UN (all agencies), OECD, GATT, IMF, together with the US, Canada, France, Germany and Italy. A central documentary centre might also be able to collect the other data which has been referred to above, i.e. stockbroker and investment analyst reports, trade association, incomes and local authority data, not to mention the considerable outpouring of what may be termed 'pamphlet material'.

The alternative to the central depository—and this attracts me considerably—is that individual libraries should specialize in certain fields or areas of documentation. I would call such a library a DCLE—a Designated Centre of Library Excellence. The question which arises is—excellent in what? The answer is: (*a*) documentation of particular governments and international institutions; (*b*) documentation relating to particular areas of study.

There would, for example, be a DCLE in German government papers and a DCLE in industrial relations and labour economics. If we take the latter, what would one expect to find? The answer is everything relating to that field of study, and it should be arranged so that one could browse. In other words it would contain such things as TUC and Labour Party reports. It would possess all published and available UK government and private statistical series relating to labour and the like. Reports such as Donovan would be complemented by a series of historical papers on British labour problems. In addition we have to recognize the existence of a vast output of pamphlets—it could be called ephemera—produced by a wide variety of bodies. I am thinking of Aims of Industry, the Industrial Policy Group, CBI, the Acton Society and the Runnymeade Trust. Every library stocks some of these but not usually all. At a DCLE one would expect to find all. Then there is another documentary series which no library will stock in its entirety, namely, the journals of the myriad of trade unions which exist in the UK. This is grass roots material for the research worker of today and tomorrow. But the list is not yet ended. Earlier I stressed the international aspect—i.e. comparative studies. One would therefore expect to find foreign documentation relating to industrial relations, incomes policies and the like.

In connection with the concept of the DCLE, I would like to raise the problem of the role of the librarian. He or she would be an academic specialist in the field. This has two advantages. Firstly, the librarian speaks with an intimate knowledge of the subject. Secondly, he or she would not merely be a collector, indexer, controller, etc. but would be able to evaluate material and understand the evaluations of academics. There is after all a need for a two-way flow of information—not only a flow from the Government to librarians but also a flow from those who handle and deal with data to those who produce it.

I would like to see DCLE's in various areas—developing country problems, macro-economic policy, industrial economics (regional policy and the like), to mention but three. It might be possible to break the system down into smaller units. For example, antitrust policy would constitute a sensible entity and it ought to be placed in a university which embraces the study of law. It would not only contain UK monopoly, merger and restrictive practices material but all the vast outpourings of the US, not to mention the reports of the Canadian Restrictive Practices Commission, the West German Bundeskartellamt and the French Commission Technique. Incidentally, attached to a DCLE would be all relevant journals and monographs from all parts of the world.

It is also worth pointing out that the librarian who ran a DCLE would be an excellent person to whom one could send an aspiring M.Sc. or Ph.D. thesis student. In this connection a thesis in progress service would be most useful.

I have now elaborated my ideal constitution. It may be objected that it will cost money. The only reply I can think of to that charge is to point out how cheap in relative terms the social sciences are, both in research and teaching. Recurrent grants to social science departments are low because they utilize relatively little in the way of consumables. Staff costs are low because they do not use many, if any, technicians or equivalent staff. Capital costs are also obviously low. All this justifies a degree of relative generosity in library provision—the library is after all one of the main laboratories of the social scientist.

DISCUSSION

MR M. B. LINE (Bath University of Technology) asked Professor Swann why he favoured decentralized centres of excellence rather than one centralized centre of excellence. PROFESSOR SWANN replied that there were three reasons for this. In the first place, he thought that if one centre was established it would probably be in London—which was fine for those living there but not so good for Aberdonians. He would like to see centres diffused around the land so that there were always a few reasonably close to any university. He did not, however, regard this as a major argument. His main point was that he expected such an institution to become inevitably more bureaucratic and less approachable than a small centre. But more important was the need to keep academics and librarians close together. There was much to be gained from this, since librarians could learn a lot from academics working in a particular DCLE field, and vice versa. For example, an academic who was in contact with foreign academics was likely to learn a lot about foreign sources, and he could then pass on this information. He thought we were on dangerous ground if we separated librarians and academics and prevented intimate day-to-day contact.

MR J. E. PEMBERTON (Warwick University Library) said that, in recommending the creation of DCLE's, this pre-supposed agreement among academics from interested institutions on where to site particular collections. Did the speaker not think that self-interest, rivalry and competing claims would machinate against such a scheme? PROFESSOR SWANN agreed that there was a strong possibility of this happening. However, he thought we were perhaps being too pessimistic. It seemed quite probable that there would, as it were, be something in this scheme for everybody, or almost everybody. That is to say, if one looked at the social sciences as a whole and recognized the number of subject areas, and then the sub-areas within subject areas, then it was quite possible that a large number of universities could be DCLEs on some topic or other. This might help to mitigate some feelings but not, of course, all of them. There was also the point that one central DCLE might provoke just as large a volume of opposition, in that it might be regarded by *all* the university libraries as a threat to them as a collectivity. The final point was that libraries drew their funds from the public purse and should be prepared to organize themselves in a way which best served the national interest. If a National Libraries Board came into existence it might be necessary to knock heads together to achieve a sensible policy.

MR LINE said that a National Libraries Board *might* give funds to libraries other than the national libraries, but it might also wash its hands on the grounds that provision was already made elsewhere—it might be better to make this provision a full central national responsibility.

MR M. WRIGHT (Institute of Criminology, Cambridge) said that, in the first part of his talk, Professor Swann had regretted that some HMSO publications were very late, and sometimes lumped data together into aggregates; but were the HMSO publications the real primary source? Was it not possible to contact someone in the Government department who compiled them, and obtain a suitable breakdown and more up-to-date information? There was a problem of confidentiality also, for example, in criminal statistics; but the Home office was prepared to make them available to *bona fide* researchers for analysis. PROFESSOR SWANN replied that HMSO publications were not always the primary source. For example, data on production and prices in particular industries often came to the government from private trade associations. In principle, it appeared as if it would be possible to deal with the time gap and aggregation problem by approaching Government departments, but his experience had indicated a reluctance to co-operate on the part of the latter.

PRIMARY MATERIALS IN POLITICS AND POLITICAL SCIENCE

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I WOULD like first of all to thank the Aslib Social Sciences Group for inviting me to address this conference and I welcome the opportunity of discussing the library and information problems that I experience in political science, not only with fellow social scientists, but particularly with members of the library profession. Because of the nature of political science, as I see it, I want first to say something about the relationship between the various social sciences, then to define politics more specifically (since I regard this as essential in considering the topic), and finally to discuss the sources and the problems they present. In company with Professor Swann, I regard myself as an amateur on the topic on which I am speaking. This being so, I will not try to provide a comprehensive or exhaustive list of primary sources in politics, but endeavour to outline the *types* of sources and illustrate these from my own experience.

Although academically the social sciences are well-established and have secured widespread recognition as legitimate areas of study, there remains considerable scepticism in the 'real' world which is the subject of our study. The old saw that where you have five economists you will have six opinions could just as easily be applied in the minds of the sceptics to political scientists or sociologists—to all social scientists, in fact; whilst not only are we supposed to exercise our faculties from ivory towers, but it is taken for granted that our ivory towers lean to the left! In his paper *Access to primary materials in the social sciences,* presented to the first meeting of this Group, Mr John Pemberton remarked: 'The thing that shocked most social scientists in the Dainton Report was the statement in paragraph 229 that only subjects like science and technology, economics and management studies—subjects which it was said were important to the prosperity of the country—only these would be given comprehensive library and information services'.[1] It is easy enough to see the relevance of these subjects to the prosperity of the country and we should raise at least one cheer for the Dainton Committee's inclusion of one of the social sciences, but we should certainly withhold the other two for its failure to recognize that science and technology exist within the context of society—the vacuum has its uses, but we do not live in one. Any vacuum that exists is one of ignorance and one that the social sciences, however imperfectly, are seeking to fill: What will be the *social* effects of this scientific discovery or that? what are the *social* implications of our rapidly expanding technology? to what purposes should our scientific and technological knowledge be put? to what extent is it necessary to devise means of controlling access to and use of that knowledge? These are the sort of questions which concern not only us as social scientists but everyone.

It is for this reason that I have chosen to speak of 'politics and political science' in this paper. This is not intended as a semantic 'straw man' but as a means of stressing politics both as a practice and a subject or area of study. I regard this as a meaningful and significant distinction and one which is especially relevant to the subject of this conference. I think it important therefore that I should define my terms—that I should say what I mean in using the terms 'politics' and 'political science'.

Let me dispose of the latter first. This is logical since I define 'political science' simply as the study of politics, although I will be saying something later about the methods appropriate to its study.

My own view of politics makes it necessary for me to say something about the relationship between politics and other social sciences, particularly sociology. 'The focus of sociology', as a colleague and I have written elsewhere, 'is . . . upon human behaviour, but it is concentrated on neither individual nor collective behaviour as such—these may be regarded as the province of psychiatry and psychology. What sociology is concerned with is human behaviour—both individual and collective, but more often collective—and its relation to society; sociology is therefore the study of human behaviour within a societal context'.[2] I should add that I agree with W. G. Runciman when he says that 'such separate disciplines as economics, or demography, or criminology, or politics should be regarded as co-ordinate but distinctive branches of sociology (or social science)',[3] but whereas sociology is concerned with human behaviour within the context of society as a whole, politics is clearly concerned with only certain aspects of society. As Phillip Althoff and I have argued:

> 'It is not difficult to suggest those aspects of society which are of central concern to the study of politics: particular social institutions, such as legislatures and executives, political parties and interest groups, immediately spring to mind, as do particular areas of human behaviour, such as the electoral or legislative processes; but it is more difficult to delimit the boundaries of political science and hence to define it. In an effort to circumvent this problem most definitions have sought to delineate the essence of politics. Thus we are told that the central concern of politics is the resolution of human conflict, or the process by which society makes decisions or evolves policies, or authoritatively allocates resources and values, or that it is the exercise of power and influence in society. Whether any of these is the essence of politics is a matter of opinion, but few would dispute that each of these concepts is of great concern to the political scientist.
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> It is in many respects helpful to regard power as the focal point of political studies, but just as we have defined sociology as the study of human behaviour within a societal context, so it is important to stress that we are looking at power within the same societal context. This still avoids the question of a definition, however, but all these attempts to suggest the essence of politics point to a particular area of study—the means by which man solves his problems with his fellow-men. Looked at in this way, political science involves the study of the problems themselves, of the machinery that may be evolved to deal with them, of the factors which influence men in their solution, and, by no means least, of the ideas which influence men in dealing with them.
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> In this sense "political science is a subject matter, not an autonomous discipline . . . The subject is defined by the problem". For the author of these words, Bernard Crick, that problem is government, which is "the activity of maintaining order."[4] Here, of course, order means the regulation of relations between men in the very widest sense and not simply that suggested in the phrase "law and order". Political science is not synonymous with the study of government, but it encompasses it in that it examines, in Crick's phrase, "the function of government in society".'[5]

I offer what is a deliberately open-ended definition of politics which allows for shifting rather than rigid or fixed boundaries. The realm of politics is subject to irregular and frequent change: certain phenomena, such as executives or legislatures, are always at or near the centre of political activity; others, such as many social organizations or, for that matter, the great majority of the population, are at the periphery and often beyond it. Thus a trade union is neither a specifically political organization nor is it continuously engaged in acting in a political manner, but there are frequent occasions, as we have seen recently, when trade unions are very close to the centre of political activity. Similarly, the electorate, though in continuous legal existence, is politically active in a collective sense only periodically and even then to varying degrees. The realm of politics alters in response to the problems with which society is faced—in this sense politics is essentially eclectic.

As an area of study, politics or political science is eclectic in another sense—in its methodology; indeed, some would say that the term 'plagiaristic' is more appropriate, given the propensity of political scientists to adopt and adapt theories and methods from other disciplines. Methodologically eclectic or plagiaristic, however, there is little doubt, as the authors of the Social Science Research Council's pamphlet *Research in Political Science* argue:

> 'that the discipline has no special axioms or techniques of its own. There are certainly a number of words and phrases, such as "power", "authority", "leadership", "freedom", "consent", "justice", "rights", which are prominent in serious political discussion. But these terms are not defined in a way independent of the natural languages in which they occur, and are not linked to form an agreed axiomatic structure, as in for instance the terminology of classical economics. The structure of political argument is complex and manifold; similarly, the methods of study chosen are from the common stock of techniques available at the time. Traditionally, the most common techniques have been those of the law, philosophy and history, but for at least fifty years there has been a growing tendency to adopt mathematical analogies (cybernetics, games theory, information theory and so on), and to use the statistical techniques which have become the common tools of the social sciences.'[6]

As a political scientist, for example, I am interested in certain economic data, in historical material, in sociological information and so on, and I rely to a considerable extent in my work on the advice, knowledge and writings of my colleagues in these fields. Here I think two points need stressing: first, that we should bear each others' needs in mind as far as possible, so that the information and data that is made available is as flexible as possible; and second, that we should recognize the overall unity of the social sciences and seek common solutions to our library and information needs. I hope therefore that the proposals that I make will be acceptable not only to political scientists but to all social scientists.

That having been said let me turn now to the particular information problems of politics. The first consideration is sources of information which, in political science, fall into three substantive categories, together with the necessary bibliographical tools. The three categories are: original documents; various types of digests, annuals, yearbooks and the like; and information gathered by means of surveys. Although original documents might seem to be the most important, in practice this varies according to the nature of the research. For example, original documents provide an excellent basis for assessing the role of particular individuals by the examination and evaluation of their personal papers; digests and yearbooks are often indispensable as sources of consistent information over a period of time; and surveys are the most effective means of the systematic measurement of attitudes and attitude change. Similarly, the distinction between primary and secondary sources is sometimes blurred: some original documents are available in published extracts or collections; the great majority of digests and yearbooks are based on material available in some form elsewhere, although they may present some of this material in a form not otherwise available, and are, in any case, often the most convenient source of much information; and the results of surveys are often published as part of wider research, although the raw data can sometimes be extracted fairly easily.

There are three types of original documents in which the political scientist is likely to be interested: personal documents, formal records, and reports. Personal documents cover a very wide range, of course, but in general they may be taken to cover the personal papers and records of politically active individuals, although it should be stressed that this includes not only prominent public figures such as, in the British case, ministers, party leaders and Members of Parliament, but also such persons as civil servants, local councillors, party officials and those who comment on the social and political scene. Furthermore, this should not be taken to exclude people whose political activity is limited in both scope and time. Many of those active in campaigns to secure the re-routing of a motorway, or the erection of adequate street-lighting, or the abolition of hanging, or abortion law reform, may be active only on that particular matter—in this sense their political 'lives' may be short, but their roles may be prominent and therefore worthy of attention.

Concentration on prominent public figures, in fact, tends to place most of the stress on such personal documents as diaries and letters, together with their frequent companion, the autobiography or memoirs. There is no doubt, for instance, that the diaries of Tom Jones (the assistant secretary to the Cabinet in the inter-war period, not the pop singer) have been of great value to writers on the British Cabinet,[7] whilst the diaries of Beatrice Webb have been a source of many acute and acid comments on her contemporaries and have been of particular use in studies of the Labour party.[8] In practice, however, quite apart from the fact that not all public figures necessarily keep the sort of diaries useful to researchers, whilst the number who are avid correspondents is probably declining, it is the *full* papers of such individuals which are likely to prove of greatest interest and use. As John Pemberton suggested in his Aslib paper, to have access to the files of MPs would provide a great wealth of material.[9] This example illustrates to some extent my point about our interest in the personal papers of not only the most prominent individuals: the personal papers of an ex-minister are obviously an invaluable source of information, but they are hardly likely to be typical of the majority of backbenchers, to say nothing of that mythical figure the average MP. In the same way, the files of local councillors would provide a great wealth of material on both individual local authorities and on the role of the councillor in the local government system, quite apart from the light they may throw on particular events.

Full access to personal papers almost always has to await the passage of time—often a very considerable time—and, although I am in no way trying to denigrate the value of historical studies, the political scientist is constantly faced with the problem of seeking information on the recent past and more especially on contemporary events. Moreover, though his research may take the form of a case-study or be similarly linked to recent or contemporary events, his wider concern is with the way in which political problems are solved, and the passage of time may itself be an important variable in this process. Thus, invaluable as personal papers of five, ten, twenty or thirty years ago are in political research, the political scientist may legitimately ask: 'Does it work the same way now?'

Failing access to contemporary personal papers the publication of autobiographies, memoirs and personal accounts of political affairs does provide an extremely useful source of information, though it inevitably suffers from the problems inherent in selectivity. Nonetheless, the autobiographies or memoirs of former Prime Ministers, like Lord Avon and Harold Macmillan (and in anticipation, Harold Wilson), or of ex-ministers, such as Herbert Morrison, Lord Kilmuir and George Brown, or of former civil servants, like Lord Salter and Sir George Mallaby, or of MPs or ex-MPs, such as Sir Gerald Nabarro and Mrs Jean Mann, to name but a few, are important sources. Nor should personal accounts of particular events be ignored. Iain Macleod's denunciation in the *Spectator* of the operation of the Conservative Party's 'magic circle' in the leadership crisis of 1963 is a case in point. Similarly, such unassuming pieces as book reviews have their day, as a scanning of the reviews of Peter Jenkins' account of the Labour Government's abortive trade union legislation, *The Battle of Downing Street*,[10] shows, whilst for what are said to be the studied revelations, Richard Crossman in the *New Statesman* should not be ignored.

If we had to rely on personal documents, however, the life of the political scientist would be much more difficult—one might say barren—than it already is. Fortunately, the availability of records and reports may provide both alternative sources of the same information and other information which is unlikely to be found in personal papers, however thorough their progenitors may have been. By the term 'records' I mean the formal minutes, proceedings or reports of the activities of any organization or group of individuals.

The verbatim records of legislatures and other deliberative bodies have always provided political scientists with an immense amount of information which may cover not only matters subject to formal debate, but a much wider range of subjects, since few legislatures are concerned solely with the legislative process. Furthermore, the legislative process itself often involves more than mere formal debate. The British Parliament, for instance, produces a vast amount of information through such devices as ministerial statements, oral and written answers to parliamentary questions, White Papers, Green Papers, and committee reports—and I am referring to *factual* information, not opinion. As sources of opinions or attitudes such records have a separate and equal value, as Peter Richards demonstrates in his book, *Parliament and Conscience,* in which he examines the way in which a number of social issues were dealt with by means of Private Members' Bills in the 1966-70 Parliament.[11]

Parliamentary Papers are perhaps the best example in the British context of the value of formal records and a similar case may be made for other legislatures, but the records of any organization engaged in political activity are always valuable and frequently vital to political research. The term 'records', however, also includes two other important sources—official files and official statistics. My use of the adjective 'official' is intended to cover any files or statistics formally maintained by an organization and is not restricted to those of Governmental origin. Access to official files of an organization, to its record of internal and external correspondence, provides a great deal of what may not be apparent from or be missing from published records, just as personal papers may form the basis for vital glimpses behind the scenes, so that as complete a picture as possible may be created.

Official statistics are equally important in many cases, whether published or unpublished, since these often form the only available statistics in many fields. Furthermore, even where it is possible to find alternative sources, such as survey data, these may be prohibitively expensive, especially to the individual researcher.

The third category of documents that I mentioned earlier—reports—may be distinguished from records in that they consist of information about an individual, group of individuals, or organization which emanates from sources other than the individual, group or organization concerned. The principal distinction therefore is that records may be regarded as authorized sources, whereas reports are unauthorized accounts and comments upon the activities of individuals, groups of individuals and organizations. In general, therefore, reports are normally less systematic, since they are subject to selectivity and editing, and less reliable, both in the sense that they may be inaccurate and in the sense that it may be impossible to vouchsafe them. In certain circumstances, however, reports may be more accurate and reliable than records, particularly where it may be thought impolitic for certain information to be *formally* recorded or published. This, for example, is the basis on which the parliamentary lobby at Westminster works: lobby correspondents are briefed by the Government and individual ministers and the information they receive usually falls into one of three classes —information which may be published and attributed to the source, that which may be published but not attributed to the source, and that which may not be published and is provided as necessary background information.

Understandably, as far as political scientists are concerned, the mass media provide the most important types of reports. This category therefore covers newspapers, various periodicals, and radio and television. National and local newspapers are a most important source of information. Some of this information is not publicly available elsewhere, but even that information that is available elsewhere is often most conveniently found in newspapers. Moreover, newspapers are a most important source and record of political and social comment and of public opinion, and play a vital role in most societies in both reporting and shaping contemporary events.

There are also a number of periodicals which perform a role basically similar to newspapers. Periodicals such as the *Economist,* the *New Statesmen,* the *Spectator,* and *Encounter* are on the whole more important as sources of political, economic and social comment rather than factual information, but as sources of *comment* they are, of course, as important to the political scientist as factual information, since the ideas and values which influence those active at all levels of politics are vital political variables.

Radio and television programmes provide a similar type of information. They are, moreover, likely to increase rather than decrease in importance. Speeches by politicians, discussions, documentaries, current affairs programmes, and live coverage of events are all obvious examples of the important contribution that these media make, particularly television. The occasional speech, talk or discussion is printed in such publications as *The Listener*, but much of this information is available only through transcripts, tape-recordings and video-tapes and, although most of our sources are still written and are likely to remain so, it would be foolish to ignore these important products of our technological age.

My second major category of information comprises the various digests, annuals, yearbooks and similar publications which are of use to political scientists. Some of these are primarily political in content: for example, *Dod's* and *Vacher's Parliamentary Companions, The Times House of Commons,* the *MPs' Chart*, and *The Business Background of M.P.s*; others contain a good deal of information of interest to political scientists, although intended for much wider audiences, for example, *Keesing's Contemporary Archives, Whitaker's Almanack,* the *Statesman's Yearbook*, and other regular publications, such as *Who's Who* and the various yearbooks and official handbooks published by many countries. The importance of these sources lies in the regular, consistent and easily accessible information that they provide.

In contrast to the sources I have already described, my third category, surveys, provides an entirely different type of information involving the systematic measurement of the socio-economic characteristics and attitudes of various populations. Some of this information is gathered and published regularly by various opinion polls and survey organizations, and is especially useful in providing evidence of changes and fluctuations in public opinion. This applies not only to the fortunes of the political parties, but to the measurement of public opinion on various issues. Thus such publications as the National Opinion Polls' *Political Bulletin* and the *Gallup Political Index* are particularly useful.

In addition to the continuing work of the opinion polls, surveys are an important tool for the political scientist in his research, and with the advent of the Social Science Research Council an increasing number of surveys have been conducted into various aspects of politics. Although the results of these surveys invariably form the basis of published studies, the original data may be available for the use of other political scientists, either formally through the Essex data bank or the study itself, or informally from the organizer of the survey. Survey work, in fact, is becoming an increasingly important part of political science research, and the use of surveys is becoming increasingly sophisticated. They are beginning to fill many of the large and important gaps in our political knowledge, gaps which were and still are to a large extent filled only by the intuition of political practitioners and researchers alike. No amount of study of personal documents, records or reports and no amount of diligent perusal of digests, annuals and yearbooks will provide systematic evidence for the development of theories seeking to explain the relationship between socio-economic characteristics and political activity, between political action and ideas.

It is perhaps something of an anti-climax (though not perhaps for this audience) to turn from the fascinating world of the opinion poll to the mundane world of the bibliography, but no discussion of the sources of information in politics and political science would be complete without reference to bibliographical sources. As far as I am aware there is no bibliography devoted solely to political science, although the *ABC of Political Science,* which consists of the title pages and lists of contents of political science journals, is a useful bibliographical tool. Apart from this the political scientist therefore uses bibliographies such as the *Social Sciences and Humanties Index,* the *International Bibliography of Periodical Literature,* the *British Humanities Index,* the *London Bibliography of the Social Sciences,* and other bibliographies devoted entirely or substantially to the social sciences. These bibliographies illustrate the eclectic nature of political science and, although some do assign a heading to political science, this almost always refers to articles and books on the nature of the discipline and its relationship to other social sciences. Similarly, the British Museum Catalogue is a useful bibliographical source, particularly for the original documents and political literature in the collection. Three other important bibliographical sources are the lists of the titles of higher degrees awarded by British universities, the annual list published by the Political Studies Association of the titles of theses in preparation, and the published list of research in progress at British universities.

Having outlined the major sources of information in political science, let me now turn to the problem that these sources present. In general, there are two types of problems: first, those concerned with the gathering of information; and second, those concerned with its storage and retrieval.

By far the most important obstacle in the way of gathering information can be summed up in one word—*accessibility.* Quite apart from the problems created by the thirty-year rule governing many governmental sources in Britain, access to personal documents is at best limited and haphazard. Furthermore, access to official files is either severely restricted or, in many cases, totally denied. Even in those cases where access is granted, it is often of such a limited nature or subject to such restrictions as to render research difficult. A similar situation exists with many organizations outside the governmental machine which are not subject to the restrictions of the Official Secrets Act, in that there is frequent suspicion of those seeking access to their papers, regardless of the qualifications of the researcher concerned. There is a widespread tendency on the part of organizations which take part in political activity, such as political parties and interest groups, to regard themselves as private organizations whose affairs are solely their own concern. In much the same way there are also restrictions on what may be published in newspapers and periodicals arising out of the Official Secrets Act, the D-notice system and the law of libel.

The balance between how much and what information governments and other organizations involved in political activities should reveal to *bona fide* researchers, and how much and what they should be entitled to withhold, is not easy to define. At the moment the balance seems tilted too much in favour of secrecy, not enough in favour of openness. Personally I find it difficult to understand why we are not allowed to know how many Cabinet committees there are (apart from the fact that their existence is traditionally kept secret); or why one of our major political parties refuses to allow non-members to subscribe to the magazine it produces for its constituency agents and organizers (apart from the fact that it is available in the British Museum); or why the Civil Service must remain so circumspect about much of its work (apart from the restrictions imposed by the thirty-year rule and the doctrine of ministerial responsibility)—to cite some examples. Of course, there are good reasons for limiting access to information: the demands of national security and the need for confidentiality in policy-formation are not difficult to justify in principle. What is difficult to justify and determine are the *limits* of national security and confidentiality in policy-formation. What are necessary are not changes of a legal nature (although there are those who regard the Official Secrets Act and the libel laws as in need of change), but changes in attitude. A more widespread attitude of openness in the provision of information is necessary, an attitude which applies not only to the Government of the day but to all individuals and organizations engaged in politics.

There is, however, a second problem concerned with the gathering of information—the problem of *systemization*. This applies to different sources in different ways. In the field of personal documents, for instance, what is needed is more systematic access to such documents so that we will have some measure of comparison to determine to what extent such documents are typical or atypical. Similarly, records and reports are less useful if they are available infrequently, irregularly and only over a limited period of time. Statistics illustrate this problem very well. A common difficulty with official statistics is that the units and populations are unsuitable for some types of research. Census statistics based on local government divisions are obviously extremely valuable for research in this field, but are of less value for other types of analysis. Thus it was a most welcome development when a breakdown based on parliamentary constituencies was provided in the 1966 One Per Cent Census Tables, but it has the obvious disadvantage of having no basis of comparison with previous censuses. These new tables should prove particularly useful in the absence of the poll returns that are available in many countries. In the same way the new statistical series, *Social Trends*, published by the Central Statistical Office should fill another important gap.[12]

This need for systemic information is beginning to be met in some fields of political science. The statistics gathered under the auspices of the United Nations, for example, have provided political scientists with statistical information which has formed the basis of useful social and political indices and indicators.[13] Here in Britain an important body of information is being established in the field of electoral and parliamentary behaviour. The series of electoral statistics prepared by F. W. S. Craig fills a vital gap in our primary sources.[14] Mr Craig has also made a further important contribution to our sources in parliamentary studies with the publication of the quarterly periodical, *The Political Companion*, which, in addition to supplementing the information on elections and ministerial composition found in *Vacher's* and *Dod's*, provides valuable statistics on the parliamentary questions asked by MPs and on their voting records in the House of Commons. A rather different service is provided by Andrew Roth, whose series *The Business Backgrounds of MPs*[15] and the individual profiles of Members that his organization, Parliamentary Profiles, is able to provide, form an important biographical service in the parliamentary field. A further important step in the latter area has been undertaken by the Study of Parliament Group with its proposal for a *Parliamentary Digest*, which would provide systematic information each parliamentary session on legislation, on the work of the House of Commons committees, on procedural developments, on governmental developments, together with an extensive summary of the main events of the session, a series of annual tabulations and an annual bibliography. It is envisaged that the digest would be issued three times a year, plus an annual summary volume.

To a considerable extent, developments of this nature are an important contribution towards solving the second type of problem which concerns sources in political science—the problem of storage and retrieval. The sort of systematic publication of information that I have described is one answer to the twin problems of storage and retrieval. It is only one answer, however, and, in any case, some information is not amenable to this particular method. For example, a good deal of information cannot be reduced to statistical or tabular forms or is not especially useful in summarized form. Personal documents, records and reports are by their nature invariably bulky, and a major answer to this problem is the greater use of microfilm and similar devices. Microfilm has two considerable advantages: it greatly reduces the bulk of original documents and it vastly increases their availability.

The use of microfilm is, however, expensive and must in practice be limited to the most important documents. Where microfilming of whole documents is difficult techniques of selectivity provide a partial solution. The use of press-cuttings is a case in point. A good deal of the information appearing in newspapers and periodicals is non-political and an efficient press-cuttings service has considerable advantages in terms of storage and retrieval. This has been clearly demonstrated by the various commercial press-cuttings services available, by those maintained by the newspapers themselves, and, in the political field in particular, by the press-cuttings services established in the Library of the House of Commons.[16] As the Social Science Research Council review, referred to earlier, points out, the 'library of cuttings maintained at Chatham House is quite essential to students of international affairs'[17] and the establishment of press-cuttings services covering the whole field of politics would be a great advance.

Technology has also provided another and much more flexible answer to the problem of storage and retrieval in the form of the computer, which not only provides the political scientist with a useful research tool but a means of storing and retrieving information beyond the scope of any other technique. The computer has the ability to store vast amounts of information in a manner which makes it easily accessible. The development of the data bank at the University of Essex is therefore a crucial step for all the social sciences. Furthermore, the computer has an important potential in the bibliographical field: one of the great problems of the bibliography is its cumulative bulk. The experience of an American university in placing the United States Code of Laws on computer tape has demonstrated the bibliographical possibilities of the computer in the field of politics: the computer 'will produce all laws requested by a user under a given heading plus other, related items, not listed under that heading in decreasing order of relevance until the user is satisfied'.[18]

In my view the development of more systematic published information, the greater use of microfilm, of such techniques as press-cutting services, and of the computer, will go a long way to solving the problems of storage and retrieval. At the same time two further developments seem to be necessary: the creation of a national archive or National Documents Centre on the lines suggested by John Pemberton in his paper,[19] and the development of a public affairs information system on the lines suggested by Anthony Barker and myself in our study of the information sources available to and used by MPs.

It is difficult for me to comment effectively on John Pemberton's proposal for a National Documents Centre, partly because I do not feel sufficiently expert on the technical problems involved, and partly because I am uncertain about the most appropriate form for such a centre. Nonetheless, I strongly favour the establishment of an authoritative body which could organize the collection of documents in the social sciences, and which could serve as a depository for papers which might otherwise be destroyed. The establishment of such a centre would, I hope, attract collections of documents, encourage their preservation, and serve as a focal point for the organization of ongoing collections of contemporary documents. Whether such a centre should be centrally located or divided into a number of subject or similar collections geographically dispersed in different parts of the country, I am not at all sure. Possibly there is a case for both, so that some documents could be retained by a national centre, others at appropriate local or regional centres. Regardless of the organization of such a collection, however, the important thing is to agree that a National Documents Centre is both desirable and necessary.

Tony Barker and I envisaged a computer-based system which would receive information from as many quarters as possible, would then process it to render it as systematic and useful as possible, and would then provide various users with the processed information. This information could be provided on a regular basis to either individuals, groups of individuals or organizations, or on a specially solicited basis to casual users in the case of information required for particular occasions or purposes. My colleagues in the computer field assure me that such a system is technically feasible, that adequate safeguards could be made to prevent abuse of the system by unauthorized users and that limits could be placed on the availability of some types of information.[20] Such a system could meet many of the needs not only of political scientists (indeed of social scientists), but of politicians as well. It was for this reason that I earlier stressed that I was concerned with sources in politics and political science, because of all the social sciences, political science should be most concerned with the relationship between theory and practice.

'Politics', Bismarck once said, 'is not an exact science', and someone else has described politics as 'the art of the possible'. The establishment of a public affairs information system would provide vital links between the practice of politics and its study, between politics and political science, and would, I hope, make politics a little more of a science and a little less impossible.

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PRIMARY MATERIALS IN URBAN AND REGIONAL PLANNING

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ABOUT two years ago Professor Peter Hall gave a series of lectures at an Oxford college on the subject of regional planning, and devoted an entire lecture to a definition of planning.[1] I have no wish to emulate such a performance, but perhaps I can spend some preliminary minutes in establishing what it is I am going to talk about. The more one reads and listens the more apparent it becomes that the word 'planning' means all things to all men—from planning next year's summer holiday to planning the American space programme. In all cases, though, there are common features. There is a goal to be achieved. The achievement of that goal is generally subject to a certain number of constraints, or limiting factors, such as the amount of time available or a limit on the financial budget. In most cases, also, there are several ways of achieving the goal and these have to be evaluated in terms of respective advantages and disadvantages, taking into account the known constraints, and one of them selected as the optimum solution. If this is then adopted as the plan, it has to be put into action, and of course the more complex the plan the longer the period of its implementation and, during that period, fresh constraints may arise, conditions may change and continuous modifications have to be made to the original statement of intent to adapt it to changing circumstances.

Planning at national level in this country can be summed up as the most efficient allocation of resources between competing interests, taking into account all relevant known circumstances and in accordance with a set of defined goals. Planning at this level is predominantly economic in character, its goals being to maintain a strong economy, with all that that implies, and its plan for achieving these goals is based on the maintenance of a reasonable economic balance between the various regions of the country. The plan is implemented by the manipulation of population and employment and other resources between the regions so that, in theory at least, those which have plenty are restrained and those which are under-nourished are boosted up. And the mechanics of such a plan are, for example, the creation of development areas into which industry is enticed by various means; controls on industrial and office development in overcrowded regions; and decentralization of various resources.

Once the resources have been allocated from national down to regional level, then within each region decisions have to be made about their spatial allocation—to put it simply, what goes where—and these decisions have to take into account what is already there, what is likely to come in for reasons other than national/regional allocation; and also, they have to take into account the defined goals of the component parts of the region, which may not necessarily rest easily alongside the nationally decreed goals for the region.

The kind of planning which I am interested in, and whose information usage I shall discuss in this paper, is the latter of these two, the kind of planning which is concerned with the arrangement in space of a variety of land uses. Most specifically it can be, and sometimes is, called 'land use planning'. This is reasonable because all plans, however social their objectives and however complex their production, have at some point to be committed to the ground, at least in part; so that it is true in that respect that planning is a land-based practice. It is also true that its basic purpose is to ensure the best apportionment of land resources between various competing uses—agricultural, urban, recreational, industrial, to name only a very few of the broader ones. More recently, the opinion has grown that an emphasis on land use accentuates the physical nature of planning and, since a growing number of planners are conscious that the physical environment is only a part of the total process of planning and that the environment itself is much more than its built form, phrases such as 'environmental planning' have been coined; and while blessing has been given to this by the creation of a Centre for Environmental Studies, 'environment' is an overworked word nowadays and its popular currency has robbed it of any precise meaning which it may once have had. Legislation has fostered the phrase 'town and country planning', and this probably has the most meaning for most people. But town and country no longer exist as separate entities: the towns have spread into the country and in some cases have merged and swallowed it; the rapid increase in car ownership has allowed town dwellers to invade the country, but has equally allowed country dwellers to make use of town facilities. Better communications all round have produced a situation in which no town can be considered—and certainly cannot be planned—in isolation either from its sphere of influence or from its neighbouring towns and cities. So 'town and country' has become 'urban and regional', which conveys much more accurately than any other label the idea of planning a town or a city in the context of its region, a comprehensive approach which embraces all forms of specialized planning, from social provision and urban motorways in the towns to countryside planning and reclamation of derelict land in the surrounding region.

This comprehensive approach to planning was endorsed in the most recent legislation, the Town and Country Planning Act of 1968. Under the previous and long-standing development plan system, each local planning authority—each county and county borough in England and Wales—had to prepare a detailed development plan for its area, which was subsequently reviewed and modified as necessary every five years. The new legislation embodies a more flexible approach to plan-making, calling for the preparation of structure plans showing a broad allocation of land uses over areas much larger than those formerly—and in fact still—dictated by local government boundaries. Full implementation of this new system has to await local government reorganization and the anticipated introduction of larger authorities, although some of the larger and more progressive of the present authorities, and in some cases groups of authorities within a sub-region, have already embarked upon the preparation of structure plans on a sub-regional scale, with central government support.

So the spatial orientation of planning has evolved from the small, self-contained unit to the larger concept of city and region, the sub-region. Equally, there has been a process of evolution in the ideology of planning and I am particularly glad that it has been included in this present social science context because this is in keeping with the direction in which planning is moving.[2] Planning, in common with other areas of study whose core is a synthesis drawn to some extent from other disciplines rather than a body of knowledge based on classical theory, is constantly in search of an identity, constantly seeking to define its ideology. Town planning in the modern sense grew out of the housing reform movement generated by the Industrial Revolution and achieved its first official blessing in the Housing and Town Planning Act of 1909: housing was the dominant partner then, and housing and rehousing still form a substantial part of the work of most planning departments, and will continue to do so for many years to come. When the Town Planning Institute was formed in 1914, its membership was composed principally of architects, engineers, and surveyors—there were no planners as such—and these origins are perpetuated in the many local authorities which still maintain joint departments of architecture and planning, or engineering and planning. The first university planning school was established at Liverpool in 1909, but it is only within the last two decades that planning has emerged as a recognized area of study, and planning schools have been set up in universities and colleges throughout the country. But even now—though of course one recognizes that this is not unique to planning—the content of planning courses varies widely and, depending on which school a student goes through, his subsequent concept of planning may differ radically from that of his neighbour.

The 1960s have seen fundamental changes in the concept of what planning is trying to do and how it is going to do it. In the first respect, the allocation of land uses and the creation of a decent physical environment is no longer viewed as the sole concern, but as the basis on which a programme of social goals can be founded, with the object of providing a better community life.[3] In the second respect, the introduction of multi-disciplinary teams into planning, initially into regional and sub-regional planning studies but now over a much wider range of activity, has brought an increasing awareness of the potential contribution of the social sciences.[4] So far the major contribution has been from economics, which has not only been the bridge between national and regional planning, but has also provided a range of techniques for adaptation to planning purposes. The contribution from sociology has been smaller in quantity and has tended to remain at the micro level of families and neighbourhoods, rather than the macro level at which economics has contributed.[5]

Both spatially and ideologically, therefore, planning has broadened its base a great deal in a relatively short space of time, and this has had a considerable effect on its information requirements; and the new demands which are being made are showing up the deficiencies, some of them critical, in the supply of information. Before I go on to discuss information, there are two further developments in planning itself which must be mentioned briefly, since they impose extra demands for information. The first of these is that the old static approach to planning has given way to a flexible, adaptive approach which recognizes the constant modifications required by constantly changing conditions. This approach was summed up in the report on the South Hampshire sub-regional study by Colin Buchanan, in a paragraph which has been much quoted, to the effect that:

> 'Planning . . . is becoming less and less a matter of precise propositions committed to paper and more and more a matter of ideas and policies loosely assembled under constant review, within which, every now and then, some project is seen to be as ready for execution as human judgment can pronounce.'[6]

This outlook is reflected in the systems approach to planning which conceives the city or the region as an open-ended social system in action, a complex pattern of inter-acting components in which changes, however slight, can cause disturbances right across the system. Systemic planning has been applied in practice in a few cases and is being applied in others and has in addition gained wide acceptance in theory.[7]

The second development is the introduction of mathematical and computer techniques into planning. Partly these have come from the large-scale transportation studies which developed in the United States in the 1950s and whose influence percolated into Britain in the 1960s, which were massive exercises in data collection and computerization; partly they have come from the influence of regional science, again originally American-based and now coming into British practice through the influence primarily of statistical geographers. Mathematical techniques, the systems approach, and the facility of the computer for applying these, have resulted in the development of mathematical models of various types—for forecasting, for simulation, for generating alternative strategies—which are now among the most promising tools of planning.

If I have seemed to talk at inordinate length about the mechanics of planning, this is because I have found very often that professional people from other disciplines are not too clear about what this particular brand of planning is, and I should like the context of the paper to be quite explicit. If I have also seemed to lay undue emphasis on the practice of planning this also is intentional—planning is a practical business, the majority of professional planners are in practice: the Town Planning Institute has a membership of around four thousand, there are some two hundred full-time teachers, perhaps a similar number of full-time research workers. Planning in the United Kingdom has a small tradition of research. The most recent published edition of the Institute's register of research, covering the period 1964 to 1967 lists some 1500 projects, but a large proportion of these are practical exercises in data collection and analysis carried out in local authority planning offices.[8] The more basic planning research tends to split in two ways: studies to establish a theoretical basis for planning practices; and work on the development of models. I am not suggesting that these categories are mutually exclusive or that they represent the whole range of the research effort. Fundamentally, though, planning is a practical activity rather than a research one, and the bulk of its information is obtained and used for practical ends.

During 1968/69, the Office for Scientific and Technical Information (OSTI) financed a survey of information use and provision in planning, the results of which established a pattern of information use among planners in all types of organizations—in teaching, in research, and in the various types of practice from one-man consultancies to central government.[9] The pattern included a rank order of importance of fourteen operational sources of information: when this was analysed by activity it became apparent that the overall ranking followed very closely the ranking of the practical activity and that three reasonably distinct groups appeared. The first group contained only two sources: maps and plans, and the *ad hoc* survey mounted for the purpose of collecting data, and these are the sources which are really used in planning and which have the most importance attached to them. The second group all rank fairly close to each other in the middle of the scale of importance and comprise mainly secondary sources, such as journals, development plans and reports, published statistical sources and government publications; and one primary source which is virtually unique to planning practice, office records. These are equivalent to what architects call 'project documentation' and are composed mainly of documentation generated by the process of planning in a particular organization, including for example, records of appeals, inquiries, and applications. In a third group, of considerably less importance, come a miscellaneous assortment of books and reports, the secondary use of data from external sources, air photographs, theses, and newspapers.

Out of these various and varied sources I want to discuss those which seem to me to be the real primary sources—although primary and secondary are not terms which are used in the planning world—in the sense that the data comes raw, or almost raw, to the planner for him to put his interpretation on it or for him to cause an interpretation to be put upon it, rather than in a form processed by an intermediate agency. These primary sources are the two most important ones from the overall rank order—maps and plans, and data collected from survey, although here I want to expand and take in the whole field of data from whatever source they come. From near the bottom of the rank order I shall take air photographs, because these are a real primary source of information for the planner and come so low in estimation, I am convinced, only because their potential is not fully realized.

I shall deal with data first, because this is a very complex problem and a very basic and important one. The process of making a survey is fundamental to planning: as long ago as 1915 Patrick Geddes published his *Cities in evolution* in which he decreed that planners should carry out a survey, followed by an analysis, followed by a plan.[10] The process of surveying an area to obtain basic information about its land uses and other activities was incorporated into the development plan system of 1947. Only in recent years has its rightness been questioned, in that plans based on existing patterns of use at one point in time are inevitably static, whereas the systems approach to planning requires a dynamic plan. The combination of systemic planning, computer power and mathematical modelling within the framework of the sub-regional structure plan, with its consequent requirement for continuous monitoring and up-dating, are factors which together have created an unprecedented demand for data, both basic and continuing. The scale of this demand has been shown by the sub-regional studies which have already been carried out, such as those of South

Hampshire, Leicestershire, and Nottinghamshire/Derbyshire; and, of course, the same scale of requirement will arise from new larger units of government. Not only is the area greater over which data have to be collected, but within that substantial area the sensitivity and fine detail necessary for accurate forecasting and planning in turn produce a requirement for data relating to quite small spatial units—the 100-metre square has been proposed as the smallest useful unit of aggregation in considering built-up urban areas—and also for a wide range of specialized data types in addition to the basic ones of population, land use, employment, and travel patterns. Forecasting of shopping demand, for example, requires data on consumer expenditure, on retail sales, on shopping floorspace, and on shopping journeys, and all of these must be at a low level of aggregation. Clearly, therefore, sub-regional structure planning calls for a mammoth exercise in data collection.

Partly this data comes from official centralized sources such as the *Census of population,* though not necessarily in published form. Partly it is gathered from specially-devised and operated surveys by the planners themselves or by specialists appointed by them. Partly it may be obtained from other exercises in data collection which have covered the same area, such as a transportation study.

The most used source of basic planning data is the *Census of population,* which is available in its well-known published format, also for planning authorities in Ward and Parish, and Enumeration District Libraries, either in the form of printout or on computer tapes. The General Register Office is further responsible for a full range of statistical information, some of it considerably processed and in some cases—the *Mid-Year Estimates of Population* is one example—published at such a high level of aggregation, in this instance local authority areas, as to be virtually useless for the detailed purposes of sub-regional planning. This is neither the time nor the place to give a catalogue of published statistical sources. There is a great quantity of material from central government sources; indeed it has been suggested that there is generally a lack of awareness on the part of planners about the data which is available, and further, it has been suggested that the central sources themselves could do more to publicize their services.[11] But it would be wrong to infer from this that central sources are fulfilling planners' requirements: there is, on the contrary, a quantity of data gathered and held by bodies such as the Inland Revenue to which planners (and others) are denied access on grounds of confidentiality, and a great deal more which are collected and stored and, being neither published nor publicized, are rarely discovered and exploited. The principal gaps in which planners require more and better data are income, population migration, and inter-regional movement generally. There is considerable feeling among planners that the policies of confidentiality which cause so much data to be withheld should be reviewed, and that data could be released at a level of aggregation sufficiently high to preserve individual confidentiality.

However efficient national data sources become, they will always be supplemented within each area by specially-designed local surveys. It has been observed by one of the foremost American advocates of computer-based systems planning[12] that the system cannot be successfully simulated unless it is thoroughly known and understood; similarly, an area cannot be planned unless it is thoroughly known and understood, and the means of acquiring the necessary local knowledge is by survey—surveys of all kinds, from studies of land use through studies of specialized activities such as theatre-going or the use of public parks, to surveys of problem areas taking in the whole catalogue of social disorders. Such detailed local data can never be collected through national agencies. The main problem with this source of data is its cost—the expense of mounting a survey is very high, assuming that the manpower and time are available, and the cost of adding one question to the National Census, for example, is probably relatively much less than the cost of mounting an *ad hoc* local survey specially to collect that single data item.

Clearly, then, if the data has already been collected in the course of another exercise, it is economic to make secondary use of it. One of the classic American urban modelling exercises, Lowry's model of Pittsburgh,[13] involved an enormous amount of small area data and only became economically feasible because of the existence of compatible data from an earlier transportation study. In this country also the same thing applies. In Glasgow, for example, considerable secondary use has been made, and much more could be made, of the data collected in the course of the Greater Glasgow Transportation Study, by local authority planning departments and the city's two universities. It is also relevant to mention in this context the use which a planning department can make of data collected by other departments of the authority—health and education statistics are obvious examples. With the increasing incidence of computers in town and county halls, there is clear scope for streamlining of data collection within each authority, a scope which will become a definite need when larger authorities come into being, and also for increased attention to the problems of data management, such as compatible referencing of data units. The total local authority data bank is an ideal not yet fully realized. In the meantime, some planning authorities, notably the West Riding of Yorkshire, have decided to go it alone and are establishing independent data banks—a move which is understandable, but regrettable in the long-term view.

I have mentioned three categories of sources from which planners obtain data and, of course, each category includes different types of sources, each of which collects and presents its data in a different way. The main problem therefore is one of compatibility between data drawn from different sources. Principally this arises in the case of differing spatial aggregations, but also occurs in differing time bases, different definitions of topics, and different amounts of information per areal unit. Problems of compatibility arise even within a single source: between the 1961 Census and the 1966 10 per cent sample Census, there were differences, small but significant: for example, in some of the definitions used and in groupings of categories within some variables, such as age. Non-compatibility of spatially aggregated data has been a cause of frustration and time-wasting for planners for many years. One of the main bones of contention has always been the total incompatibility of the enumeration district unit used in the Census, and the Employment Exchange unit used by the Department of Employment. Further, the level of these aggregations to areal units too large to be used for fine detail, and the inability to disaggregate the data once processed, have been among the chief constraints on the development of mathematical models. The planning authority in its own surveys collects land use data on an individual land parcel basis, and this has to be aggregated up to be compatible with population or employment data. Changing areal units and changing local boundaries over a period of years produce inconsistencies within a single source of data and cause difficulties in the use of time series data, which is vital for forecasting purposes.

Quite soon, in the 1971 full population Census, a new unit of aggregation will be introduced which will render the data from this Census spatially incompatible with the data from all previous Censuses. But while the decision to publish the 1971 Census data on the basis of the kilometre grid square as used in the National Grid does produce problems of incompatibility, it is nevertheless seen as a development of great value and significance. For not only does it provide data aggregated to a unit small enough to be useful in sub-regional planning (which the enumeration district unit was not), it also provides a ready-made framework for locational coding through the National Grid co-ordinate referencing system. By making use of the system, a 12-digit reference can be used to locate points in two-dimensional space to an accuracy of one metre, which means in effect that all areas down to the level of the individual property can be assigned a unique locational code. The implications of this universal code for data management are great, and, although there are many problems to be solved, several planning authorities have decided to make the change to organizing data on a grid square basis, and a regional data bank is being established in the Yorkshire/Humberside region at this level. Also under discussion is whether the 1971 Census data is to be published also at levels of aggregation lower than that of the kilometre square, at the 100 metre square or hectare level. Publication at this level involves an enormous quantity of data: there are sixteen million 100 metre squares covering this country: 87 per cent of these are empty in terms of population, but even excluding these it has been calculated that the data for the remainder which do contain population would require storage in the order of 250 magnetic tapes. If, though, the Census collects its data by individual parcels of land with unique grid co-ordinate references, as seems likely, then special aggregations to meet particular requirements should be available.

In the light of this development it seems likely that data management will from now on be geared to the kilometre square, for purposes of aggregation and referencing. This presents no technical problems for the collection of new data, but it does present major problems in the transformation of existing data from its existing aggregations to the kilometre square. Development has been going on at the Department of the Environment, Whitehall (formerly the Ministry of Housing and Local Government) of a method of transforming data from a polygon base to a square one, and a computer programme has been developed which will effect such a transformation in conjunction with a cartographic digitizer, using grid co-ordinates as the common element. Data has been transformed for practical purposes in sub-regional studies such as Leicestershire and Notts/Derbys, Leicestershire, as an example, involving about 2400 kilometre squares. So the technique is there, although 100 per cent accuracy cannot be assumed: the main problem lies in deciding how much of existing data should be transformed, taking into account the size and cost of the exercise.

Another development of the 1960s which goes in parallel with the development of data management is that of producing maps by computer, which show the spatial distribution of the topic of the data input—population, for example, types of agriculture, or housing conditions.[14] And this leads to the second primary source of planning information—maps and plans. In truth, some maps are more primary than others, if such an expression may be allowed. Some maps illustrating the geography of themes—mortality, for example—are based on data which has been well processed in order to put it into a form which can be graphically presented in a meaningful way. Much depends on the form of presentation and the scale of the map: representation of population density by proportional spheres on a small-scale base map, for instance, must obviously require very coarse gradings within a very wide range and, therefore, the actual information content of the map is small because the processing has been so heavy. At the other extreme, the maps at 2½ inch scale which are in the course of production by the Second Land Utilisation Survey of Great Britain are real primary documents 'in the sense that the data are recorded directly, field by field and building by building. They are not plotted at second hand from statistics and they are not generalized in any way that obscures the true shape of any area'.[15] The Director of the Survey has written that the maps 'were first conceived as a graphical data storage bank—a factual record of the use being made of British land during the 1960s'.[15] The larger scale Ordnance Survey topographical maps, particularly the plans of urban areas at 25 inch and 50 inch scales are further examples of primary sources through which the data is transferred direct from the ground, as it were, to the user, without intermediate treatment. In the smaller scale series, of course, the degree of generalization required filters out a lot of detailed information.

In the OSTI commissioned survey of information use, to which I have already referred, a distinction was made, in the section of the questionnaire relating to maps and plans, between topographical and thematic maps—a distinction which in fact is an artificial one and which is not recognized by authoritative organizations such as the Map Library of the Department of the Environment, Whitehall, but which seemed necessary for practical purposes. It was found that of the planners in the sample, 98 per cent used topographical maps, whereas only 55 per cent used thematic maps. The high use of topographical maps is as expected. I would hazard a guess, however, that the much lower use of thematic maps (which can roughly be defined as maps which show the geographical distribution of a theme—which may be as broad as employment or as narrow as death from bronchitis—and which are also referred to as statistical maps since they are mostly based on statistical data) is due at least in part to a lack of awareness of their existence. In addition, while planning departments generally either hold or have access to adequate stocks of Ordnance Survey topographical maps and plans, the same cannot be said for thematic maps. The absence of a catalogue, indeed of any form of publicity whatsoever, from the Map Library of the Department of the Environment, Whitehall—the largest central resource in the country—does nothing to increase the planner's awareness of what could be available.

There is a great deal of mapping activity going on all over the country, particularly in universities. While some part of this activity is done for specific local purposes, and some maps never progress beyond a roughly drawn state, there is, nevertheless, I am sure, a lot of potentially useful material being produced in map form which could be exploited if its existence and location were known.

Finally, I want to mention a third, and under-used source of planning information, which is very clearly a primary source in the sense that I mentioned in connection with maps, of the data being communicated direct from the ground to the user—this is the air photograph. In this case there is no question of the data being processed or generalized—the camera is indeed candid and records precisely what it sees, the onus of interpretation being entirely on the user of the photograph. Air survey has an advantage over a ground survey of land use in that it can see into and record areas to which foot surveyors may be denied access—backyards, for example, which may be in use for unrecognized purposes. On the other hand, it has a disadvantage in that it can record only what it sees, and has no means of indicating that a single house is occupied by thirteen families or that the building which is externally a church is internally a warehouse.

Air surveys are used principally as a means of recording land use over a large area and as a means of up-dating Ordance Survey topographical maps. There are of course many other uses to which they can be put, for example, traffic and parking surveys and site analysis, but these are fairly specialist activities and are not widely in evidence, at least at the present time. They also have a potential for use as a source of basic data and up-dating data for the sub-regional data banks. Clearly, over these large areas of planning, it is much quicker and easier to fly a survey than to send staff on the ground, and, though it has not actually been proved, probably more economical.

The bulk of the available air cover of the United Kingdom is accounted for by the four commercial companies—BKS, Hunting, Fairey, and Meridian—the Department of the Environment, Whitehall, which has the services of the RAF, and the Ordnance Survey. The single centralized source is the Air Photo Library of the Department of the Environment, Whitehall, which contains upwards of two million prints of England and Wales flown since 1945; the Library will not lend, but will sell prints on application. But, as with the same Department's Map Library, the resources are little used outside the Department itself and in fact little known, and the service is not publicized. Following a Canadian precedent, however, the Department is now in the process of establishing a central registry of air photographs which will act, not as a provider of the prints themselves, but as a clearing-house of information about the availability of prints; such a central service will meet a major need in planning and should, as its Canadian counterpart has done, stimulate the use of air photographs as a source of information.

Despite what would seem to be an obvious basic use, not to mention an unexploited potential in a number of useful directions, the actual use of air photographs by planners is in a rudimentary state in terms of both quantity and quality. Whether or not a planner uses air photographs depends on whether or not his organization is prepared to meet the cost of providing them; at present, many organizations are not, or cannot. Conversely, given full air cover of the relevant area, whether or not a planner can use it depends on whether he has had proper training in air photo interpretation—and many planners have not. By and large, there is a failure on the part of planners to appreciate all the possibilities of air photographs. These obstacles are not insurmountable. The cost can be reduced either by several organizations co-operating to have a survey flown, or by a single organization having a survey made as a secondary function of another flying operation. Training in air photo interpretation is in the hands of the planning schools. Whether or not the profession will realize the full potential of the source depends to a large extent on its willingness to be convinced by the small number of experts who constantly advocate its use, both verbally and in print. As one of these experts, Dr Gordon Collins of Leeds University, has pointed out: 'There is a technological revolution taking place in the acquisition of information by airborne methods, and if the planner is to remain professionally competent to tackle some of the new and complex problems which exist then he must be aware of the various sources of information that are, or could be, available to assist him in his work.'[16]

This of course could be said of all the information sources, primary and secondary, which are available to planners—and seems a suitable epitaph with which to end this paper.

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THE BRITISH MUSEUM LIBRARY AND THE COLLECTION OF PRIMARY MATERIALS

R. J. FULFORD

British Museum Library

Invited comments made at the Social Sciences Group 1st Annual Conference, Loughborough, 1st–3rd January 1971

PERHAPS the first thing that needs to be said is that, although we have not called it by the name until recently, the British Museum Library has been acquiring social science material throughout its existence and I was glad that many speakers have paid tribute to the richness of its collection.

As far as United Kingdom material is concerned, the workings of the Copyright Act have been erratic, but it has nevertheless drawn into the library a large quantity of ephemeral material of interest to social science researchers of the kinds which speakers have mentioned, such as publications of political parties and trade unions, annual reports of voluntary societies and professional associations, house magazines of private firms, and so on. We have not taken a very positive attitude to the acquisition of this material in the past. We accepted what came but did not actively seek to acquire material which from the point of view of the legal interpretation of the Copyright Act may not have been 'published'. We are now aware that we should take a more positive attitude to the acquisition of British material, and we hope that it will not be too long before we can allocate professional library staff to this problem. It is not going to be easy to decide in which direction it is most profitable for us to move. It is clear from what we have heard at this conference that the amount of potential material is vast and that to attempt to collect everything would lead to collecting nothing adequately. At the beginning, I suppose, we should try to act where present efforts by other libraries are weakest, but it is going to be difficult to identify these areas.

One particular strength of the British Museum Library collection which I should like to mention is that of foreign government publications. The first international exchange arrangement was made as long ago as 1883, and although our holdings of the publications of different countries are not equally good as far back as that, the collection is extremely comprehensive, and we have now an arrangement with many countries for the deposit of all official publications. We have, as one would expect, comprehensive collections of the official publications of the British colonies, and in spite of the difficulties we have tried to maintain the comprehensiveness of these collections since the colonies became independent countries.

We are aware of our shortcomings in providing information about material which we have. Foreign government publications especially are not traceable in the General Catalogue. One gap which we hope to fill at the earliest possible moment is that of a catalogue of all serials held by the library. I am sure that this would be of greatest assistance to workers in the social sciences. I should like to remind you of the existence of our published *Subject Index* which is a record of all material acquired by the library dated after 1880.

We are at present investigating whether it would be possible to expand the reference facilities of the State Paper Room to cover certain of the social sciences in general, that is to say, without restriction to official material. The physical limitations of the building pose considerable difficulties but if the plan can be realized it would have the double effect of improving conditions in the Main Reading Room by hiving off certain classes of readers and providing better reference services for a range of subjects than are provided at present.

The long-term situation will presumably depend on the views of the British Libraries Board on how the library needs of social scientists should be catered for on a national scale. As far as reference facilities in Central London are concerned, I am sure that the British Museum Library and the British Library of Political and Economic Science at LSE will be seen as two complementary parts of an overall provision, especially as they are only half a mile apart. Each of the two libraries will continue to build on its existing strengths, and we can be sure from what we have heard at this conference that there is so much waiting to be done that it will tax the likely future resources of both institutions to the full.

It seems to me that one decision which could well be taken in the future would be to leave to local institutions (university libraries, public libraries, county archives, etc.) the task of collecting social science material of local origin and of largely local significance, leaving the national institutions to collect material produced by national organizations and of national interest.

Lastly, it seems to me that we shall all have to devote more attention in future to the recruitment and training of social science librarians. The British Museum Library so far has no professional staff trained in the disciplines which speakers have been discussing at this conference, though that situation ought clearly to be remedied soon. One obvious difficulty is that the social sciences cover such a wide range of interest that someone trained in one discipline will not necessarily be at home in the others, yet there are so many aspects of social sciences that even the largest library could not hope to have an expert member of staff in every single field. Perhaps this ought to be the subject of another conference!

THE BLPES AND THE COLLECTION OF PRIMARY MATERIALS

D. A. CLARKE

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Invited comments made at the Social Sciences Group 1st Annual Conference, Loughborough, 1st-3rd January 1971

THE British Library of Political and Economic Science was founded as a national library of the social sciences which would pay particular attention to collecting documentary materials: it continues to be available to all scholars conducting research in the social sciences, and is rich in primary materials over the whole range of social science subjects.

It is particularly rich in official publications. Since 1903 it has been a depository for all US federal government publications. Publications of all other countries (other than those in Oriental languages) are acquired extensively, though not on the same scale as the BML. BLPES is participating in a scheme initiated by the Institute of US Studies for coverage of American State publications. A great deal of effort is put into the collecting of official publications on special topics, e.g. planning and family law. It is a depository for the publications of the United Nations (also receiving those of subordinate UN organizations on a generous scale) and for the European Communities and the Organization of American States. A cross-section of local authorities in Britain deposit their committee papers in the Library.

In the unofficial field, a great deal of effort is put into the documentation of political parties, pressure groups, industrial and labour unions, etc, from all over the world. By reading the periodicals, and using our contacts, we think we get a high proportion of the significant publications: though the level of our coverage is limited by the staff time available. (For example, we are reasonably confident of our coverage of the significant publications of the Italian Communist Party, but should be unlikely to pick up those from the branch in Taranto.)

BLPES receives bank reports and company reports on a large, but selective scale: it contains the entire records of a merchant bank (Wm. Brandt's Sons & Co.) and of the Steel Company of Wales.

In the political field, BLPES has the papers of such figures as the Webbs, Dalton, and Beveridge. It devotes particular attention to socialist movements. It collects political manifestos, and more selectively the records of local political parties.

In all its collecting of documents, BLPES is greatly assisted by its close association with LSE and its ability to use the contacts and expertise of its academic staff.

Its holdings are published as *A London Bibliography of the Social Sciences.*

Although much of the material does not have to be paid for, systematic collection is expensive, since it is dependent on highly qualified staff, first to discover the existence of the required material and then to find a source of supply. Much of BLPES' expenditure on acquisitions is therefore on staff salaries rather than on booksellers' bills; and finance is at present the real factor limiting the scale of coverage.

Since before the publication of the Dainton Report, BLPES and BML have been discussing co-operation with a view to maximizing national coverage of primary materials. At the present stage, BML's exhaustive coverage of Government publications arising from the international exchange treaties is complemented by the more energetic coverage of non-official material by BLPES; and it is planned to enter into a more detailed division of labour. The special responsibilities of BLPES for the support of teaching and research at LSE would, however, probably prevent BLPES from withdrawing entirely from the coverage of topics or areas of special interest to LSE.

Proper provision for the need of social scientists for primary materials cannot be made by relatively passive receipt and storage of material. Success must depend on active collection by a specialized and experienced staff, assisted by wide contacts and institutional prestige. Once collected, the material must be made available to scholars with all the facilities of a major library and the support of subject specialists. It is therefore suggested that any national arrangements for the coverage of primary material must be achieved, not by the establishment of a new, comprehensive collecting agency, but by building on the existing resources of BML and BLPES and perhaps some other more specialized libraries.

PRIMARY MATERIALS IN THE SOCIAL SCIENCES

CONCLUSIONS

M. B. LINE

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Chairman, Aslib Social Sciences Group

Statement made at the Social Sciences Group 1st Annual Conference, Loughborough, 1st-3rd January 1971

THIS conference is both important and timely, because of the imminent appearance of a White Paper on the British Library, and the possibility of influencing government policy on the provision of social science materials at a national level. Obviously the British Libraries Board will have a great many matters to see to, and there is a great danger that questions such as we have been discussing will go by default unless a special point is made of them. The Aslib Social Sciences Group is one of the few bodies with the background and expertise to make comments and proposals.

Definition of primary material

There seemed to be some uncertainty during our discussions as to the correct definition of 'primary material'. To some it means first-hand, raw material; to others, material which is unpublished, or of which only a few copies are available; to others, material which is published, but not copyright, and therefore not automatically included in the holdings of the British Museum Library; to still others, it means material which is ephemeral, and which although produced in a large number of copies becomes unavailable extremely quickly. Government publications were mentioned by several of the speakers as primary materials, although many of these are published in very large numbers of copies by HMSO. The exact definition need not matter very much; in any case, it would be wrong to attempt to make a clear division between primary and secondary material—rather they form a continuum, one person's primary material being another person's secondary material.

Various categories of primary materials were mentioned. I do not wish to list all of these now, but one may note unpublished survey reports, raw statistics, personal reminiscences, records and minutes of meetings, local political manifestos, parish records, etc., etc. This very wide variety of primary material raises the question whether it can, or should, all be handled in the same sort of way by the same sort of library.

The main form of primary material is of course still written; however, other forms of recorded knowledge were mentioned, including sound recordings, video-tapes, pictorial media such as air photographs, and, significantly, machine-readable files, whether on punched card, punched tape, magnetic tape or whatever. There is every probability that these non-written forms will increase in quantity and importance in the coming years.

Physical collection of primary material

Much of the material mentioned in the conference would be very difficult to collect, e.g. the papers produced during a local strike lasting a few days, or documents held by solicitors. Should there perhaps be some national network of voluntary primary data collectors? In some cases, one has the feeling that primary material ought to exist, though it does not; should perhaps production of it be stimulated in these cases? For example, an important meeting may be held of which no records are kept, though they could be of great importance to the social and economic historian.

As material is collected, *where* should it be housed? At present, there is nowhere very obvious for collectors to deposit material even if they want to; and the two most obvious places, the British Museum Library and the British Library of Political and Economic Science, were hardly mentioned by the main speakers during the conference. One most important point that kept recurring was the question of centralization as against decentralization. I think we can rule out, to start with, either extreme. Total decentralization raises difficulties because of the political problems and in-fighting that would be caused by the attempt to establish centres of excellence; by the overlap in disciplines; by the need for all the numerous libraries to provide satisfactory storage and control over a wide variety of materials; by the problems of establishing national bibliographic control over dispersed collections; and—most important at the present time—by the sheer political improbability of the Government's supporting a large number of libraries: there is much more chance of getting them to fund the collection and storage of material if it is made a central national library responsibility.

However, total centralization is equally out of the question. Some material is solely of local interest, and much material would not be put into libraries at all if it were not for the personal contacts and knowledge of individual librarians. The material collected by Mr Laslett at the Cambridge Group for the History of Population and Social Structure would not have been collected at all if it had not been for Mr Laslett and Dr Wrigley, and it would scarcely be reasonable to insist that all this material be stored somewhere in London rather than in Cambridge, where it is at the moment being heavily used.

However, since there should be some national policy, the balance should almost certainly be in favour of a central collection, with a fair amount of dispersion among libraries assumed, and with machinery for control and co-ordination. It is very clear to me that any central collection must be based on the British Museum Library and the British Library of Political and Economic Science, partly because these libraries already have massive holdings of primary material in the social sciences, partly because the British Museum Library is a national library, and there is every probability that the national responsibilities of the LSE will be recognized. By contrast, there is very little possibility that the Government would finance a totally new institution set up to collect social science material, and without Government finance it is hard to see how such a collection could be established at all. Further, it is only in very large libraries that the large range of expertise and specialisms required could be found.

One question which came up once or twice during discussion was the comprehensiveness of the national collection. Should it aim at collecting *everything*, or should it select? If it does select, should this be on a random basis—which almost automatically favours certain strata of society—or should it aim at deliberate sampling of material? The trouble is that almost everything can be social science primary material—including the informal conversations that have gone on between individuals at this conference. To collect all of this would obviously be a nonsense, but where exactly does one draw the line?

In addition to ordinary documentary material, there must be a national collection of non-book materials—films, video-tapes, sound recordings, photographs, machine-readable files, etc. It seems to me that this too should be based on, or closely linked with, the British Museum Library or the British Library of Political and Economic Science. One point here is that this material could be even more voluminous than documentary material in years to come, and whereas one can condense documentary material by microfilming, very little of this material is amenable to condensation or miniaturization. The storage problems could therefore be extremely severe.

Physical access to primary material

Nearly all of the primary materials mentioned by speakers during the conference required consultation rather than inter-library lending; several mentioned the importance of browsing through the material. Certainly, little of the material would seem to be suitable for inter-library lending; much of it is unique, and little of it can be identified in advance. What one would therefore envisage is a reference collection, *but* with superb on-the-spot copying and filming facilities, so that the scholar, having browsed through the material and identified what he wants, can in nearly all cases take a copy away with him. This policy would put the problem much more in the court of the British Museum Library than of the NCL and NLLST.

On a rather different question of access, there were universal complaints of access to government data; this incidentally was an extremely common complaint in my OSTI-supported Investigation into Information Requirements of the Social Sciences (INFROSS). The situation does seem to be improving, but pressure is needed to improve it still further.

Bibliographic control

Bibliographic control is a secondary problem to collection and access. Once the material is collected, even rough sorting is adequate for many purposes, and, in any case, full cataloguing is quite inconceivable for every piece of ephemera. The problem lies rather in establishing to what depth indexing should go. Professor Jones mentioned the conceptual problems in the social sciences that make both indexing and classification very difficult; these problems would certainly be no less for primary material than for secondary material. Here again, it is imperative that subject specialists should be involved.

Assuming, as we must, that there will be a large measure of dispersion, some national register is needed of collections other than the central collection. At present there is a great deal of material scattered over the country, much of it unknown to researchers working directly in the field. Even for central collections such as the BML and BLPES, publicity is needed; I think we must be cautious about criticizing speakers who show ignorance of these central collections, as the fault may lie with us for not making them aware of their existence. The positive role of these libraries, in publicizing their holdings and providing access by every means available, should be emphasized.

Other points

I noted some other points during the conference on which some comment may be useful now. First, it struck me that social scientists generate as much primary data as they consume, in some cases more; for example, social administration seems to generate a great deal of primary data, and in so far as it uses primary data, this is because the persons in question are doing historical research. In fact, many of the needs for primary data that were mentioned during the conference are for historical material, and raise the same problems as face the ordinary historical researcher. At the same time, it must be remembered that the current data being generated needs to be collected for future historians.

This conference has not attempted to cover all the social sciences; for example, there were no speakers for psychology, sociology, anthropology, criminology, and so on. Even among the range of disciplines that were considered, many of the same problems seemed to arise, sufficiently so to enable us to draw some valid conclusions and provide information on which we can act. However, it might very well be worthwhile to hold another conference in a year or two's time, covering some of the disciplines we did not discuss here; it is always useful to hear researchers talk about their own needs, and to bring researchers and librarians together to discuss common problems.

Conclusion

There are two main questions: what should be done, and what can we, the Aslib Social Sciences Group, do? First, it seems to me we must press hard for the recognition and support of a national collection of primary material in the social sciences, based primarily on the BML and BLPES. Secondly, we must press for the establishment of a national register of collections of primary materials in the social sciences; some work is already being done on this, but this constitutes only the beginning. We are in a good position to indicate what form this register should take, and possibly to provide the personnel who will be required to build it up. Thirdly, there is need for a network of collectors, of individuals who will keep their eyes open for material as it is generated and produced; and perhaps this is an area where we as individuals can take some initiative. Above all, we need to make the point that the collection, storage and control of primary material in the social sciences are emphatically the responsibility of the forthcoming Board of the British Library.

Letter to the Editor

Dear Sir,

THE FOREIGN-LANGUAGE BARRIER

May I reply briefly to Dr Urquhart's letter in the January issue (p. 50) on the question of translations? His proposal that more languages should be taught at school, and that this would increase the probability that a research team of mature scientists would have a range of linguistic competence, implies the following:

1. that teachers can be found to teach a wider range of languages at school;
2. that some pupils studying science will be prepared to opt for languages such as Japanese and Russian;
3. that adult scientists, having learnt these languages at school, will retain a good reading ability in them years later;
4. that, if they retain a reading ability in them, they will have the motivation to read articles in them rather than obtain a translation;
5. that the statistical probability of a team—of 3, 4, 5 or 6?—having among its members someone who can read at least one language other than German or French is sufficiently high to make a national translation service unnecessary for a fair proportion of articles.

Even if all these conditions were fulfilled, I would still expect the nation-wide demand for translations of many articles to be great enough to make the provision of translations for loan (or purchase) necessary. If a translation of a given article has to be made for one individual or team, there is little point in other individuals or teams reading it in the original. The contribution Dr Urquhart's proposals would make to solving the language problem would, I suggest, be so small as to be negligible.

Yours faithfully,
MAURICE LINE
Librarian

Bath University of Technology,
Claverton Down
Bath BA2 7AY.
3rd March 1971

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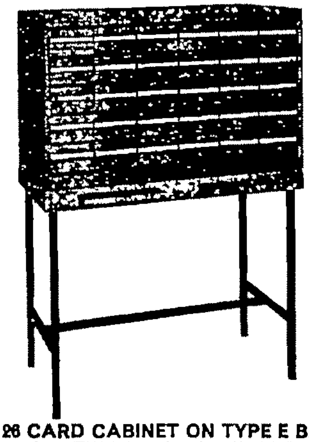

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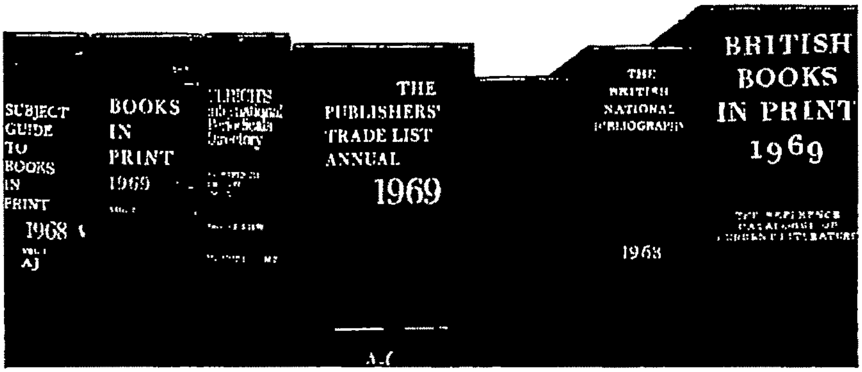
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ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 23 May 1971 Number 5

ASLIB CALENDAR 1971

June

TUE. 1.	Social Sciences Group Evening Meeting and Lecture: 'The INFROSS project', by Maurice Line. Aslib. 5 for 5.30 p.m.
WED. 9.	Aslib Annual General Meeting. Aslib. 5th Aslib Annual Lecture. 'Words and Documents', by Dr H. Coblans. Senate House, London University. 6 p.m.
FRI. 11.	Technical Translation Group Meeting and Lecture. Speaker: John Edmunds (BBC Television). IEE, Savoy Place, WC2 3 p.m.
MON. 14.	Co-ordinate Indexing Group Meeting and Lecture. Aslib. 3.30 p.m.
TUE. 15.	Economics Group visit to London Graduate School of Business Studies, NW1, and lecture by K. D. C. Vernon: 'Management literature and its classification, 5.30 p.m.
WED. 16.	Aslib One-Day Symposium: Problems of using external information services. Royal Aeronautical Society, Hamilton Place, W1.

July

FRI. 9–SUN. 11.	Electronics Group 13th Annual Conference. Churchill College, Cambridge.
FRI. 23–SUN. 25.	Aeronautical Group Annual Conference. Cranfield Institute of Technology.

October

SUN. 10–THU. 14.	Aslib 45th Annual Conference. Darmstadt, W. Germany.
WED. 20.	Aslib Evening Meeting. 'Ergonomics and libraries', by J. G. Fox (University of Birmingham). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1. 5 for 5.30 p.m.

Annual General Meeting

The attention of members is drawn to the Annual General Meeting of Aslib, which will be held on Wednesday 9th June 1971. All details of arrangements and the Agenda and Annual Report for 1970 have been circulated separately.

Members are also reminded that the Fifth Aslib Annual Lecture, to be delivered by Dr H. Coblans, will also be held on Wednesday 9th June, in the William Beveridge Hall, Senate House, London University, beginning at 6 p.m. See the April issue for further details.

Midlands Branch

At the 20th Annual General Meeting of the Branch, held in the Club Suite at the Engineering and Building Centre, Broad Street, Birmingham 1, on Thursday 25th March 1971, the following Committee was elected:

Chairman: Miss M. Y. Scott (IMI Ltd)
Vice-Chairman: A. Nicholls (Birmingham University)
Hon. Treasurer: Mrs M. J. Pennells (Ergonomics Information Centre)
Hon. Secretary: A. T. Jones (BIP Chemicals Ltd)
Members: Miss J. Adams (GKN Ltd, Wolverhampton)
F. J. Goldie (Unilever Ltd, Sharnbrook, Beds)
Miss L. V. Green (BSC, Ashorne Hill College)
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M. S. Robinson (MIRA, Nuneaton)
J. H. Seals (University of Aston, Birmingham)
D. R. C. Whale (Tube Investments Ltd)
D. P. Woodworth (School of Librarianship, Loughborough)
Miss J. Young (Courtaulds Ltd, Coventry)

Aeronautical Group

The 20th Annual Conference of the Aslib Aeronautical Group will be held at Cranfield Institute of Technology, 23rd–25th July, 1971. The programme for this year's conference includes papers by: Miss Stella Keenan of the National Federation of Science Abstracting and Indexing Services; Professor D. J. Johns of Loughborough University on 'Aerospace Technology—its challenge and "spin-off"'; Sqn. Ldr. Darrol Stinton on the future of the airship; Mr A. B. Johnson on the work of the Federal Aviation Administration; Mr D. Kennington on managerial aspects of librarianship; and a short 'refresher course' by Mr L. J. Anthony on the work of Aslib.

The AGM of the Group will be held at 7.30 p.m. on Friday, 23rd July, the first evening of the conference. Conference fees will be £12.75 including accommodation, meals and gratuities.

Full details and conference programmes will be published at a later date. In the meantime, the Group Chairman, Mr E. J. MacAdam, Deputy Librarian, Cranfield Institute of Technology, will be pleased to answer any enquiries.

Social Sciences Group

The OSTI-supported Investigation into Information Requirements of the Social Sciences finished in December 1970, and four reports on the project are being submitted to OSTI. The first public presentation of the findings will be made at a meeting of the Aslib Social Sciences Group on 1st June, by Maurice Line, who headed the project.

The investigation was the first comprehensive study of information needs in the social sciences, covering as it did social scientists in several disciplines and in different environments. Effort was, however, concentrated on research needs, and the talk by Maurice Line will be mainly concerned with these and their implications for the future of information systems in the social sciences.

Audio Visual Group Workshop: Proceedings

The Proceedings of the Audio Visual Group's Workshop, held in May 1970, have recently been published by the Group. The workshop was arranged to provide a forum for discussion and exchange of views on audio visual librarianship.

The five papers presented are reproduced together with a list of delegates. Papers and speakers were as follows: 'Audio visual aids in a College of Education library' by Pamela Lea; 'Pictures: the Radio Times Hulton Picture Library' by Daphne Moss; 'Tapes and archives: BBC Sound Archives' by Marie Slocombe; 'Slides and filmstrips: handling and storage' by Diana Wyllie; and finally, 'Non-book materials in the university' by L. J. Lawler.

The publication costs 50p to members and 60p to non-members, and is obtainable from Miss Frances Thorpe, Slade Film Department, University College, Gower Street, London WC1.

Library Advisory Council for England

The Secretary of State for Education and Science, Mrs Margaret Thatcher, has appointed the following new members to the Library Advisory Council for England:

Mr D. E. Bagley	County Technical Librarian, The Hatfield Polytechnic.
Mr J. F. Blagden	Librarian and Information Officer, McKinsey and Co., Inc.
Mr W. Caldwell	Head of Department of Librarianship, Newcastle-upon-Tyne Polytechnic.
Dr B. J. Enright	Librarian, University of Sussex.
Councillor D. F. How	Member, London Borough of Lambeth Council.
Alderman D. Sisson	Member, Huddersfield County Borough Council.
Dr J. D. Stewart	Associate Director, Institute of Local Government Studies, University of Birmingham.
Mr K. A. Stockham	County Librarian, Nottinghamshire.
Alderman Mrs M. M. Trotter	Member, Leicester City Council.
Mr D. H. Wilcockson	Chief Education Officer, London Borough of Havering.

Training in Information Work

Under the sponsorship of FID, the Istituto Nazionale dell'Informazione (INI) of Rome is organizing an International Conference on 'Training in Information Work', to be held in Rome from 15th to 19th November 1971. The previous conference on this subject was organized by Aslib and held in London in 1967.

Some twenty papers will be presented at the Rome meeting covering two main themes: training of information specialists; and education of information users. These papers will be presented by invited speakers only, but written communications are invited from participants for distribution at the conference and for use at the discussions. The deadline for submission of these communications for consideration by the Conference Committee is 1st August.

The conference is open to individuals and organizations from every country. The registration fee is $30 up to 1st August 1971 and $35 after this date.

Further details can be obtained from: Conference Organizing Committee, Istituto Nazionale dell'Informazione, Via Calamatta 16, 00193 Rome.

Scottish Summer School of Librarianship

The Scottish Library Association is holding its Summer School this year from 3rd to 9th July at Newbattle Abbey College, near Edinburgh.

Topics to be discussed this year include: the future of the British Library service; resource centres and the new media; recent developments in reference sources; function and form; re-appraising the public library service; and design in the library. Among the sixteen speakers will be the Presidents of the Library Association and the Scottish Library Association, Donald Urquhart, Arthur Wells, Denis Roberts, A. Leslie Smyth, James Olle, William Critchley and William Murison.

The fee for the School is £21. Further details and an application form are available from Mr A. G. D. White, Blackhall Library, Hillhouse Road, Edinburgh EH4 5EG.

West London College–Department of Librarianship

The Department of Librarianship at West London College is holding two events in June which may be of interest to members.

On 23rd June a meeting will be held to discuss the continuing need for part-time and occasional courses in librarianship and information work. Speakers will represent academic, public and special libraries and the audience will be invited to discuss the points they raise.

On 30th June a one-day course will be held at the College on 'Foreign-language bibliographical terminology and library services—French, German and Russian'. This experimental course will be designed to give basic, essentially practical information to those who, for instance, have to interpret the elements of title-pages; to transliterate titles in Russian; or to identify national bibliographical and library organizations.

Further information is obtainable from the Course Tutor (Librarianship), West London College, Greyhound Road, London W14 (01-385 5175).

International Symposium on UDC

The Yugoslav International Center for Technical and Scientific Documentation, in co-operation with technical bodies of FID (FID/CCC, FID/CR and FID/TM), is organizing an International Symposium on 'The Universal Decimal Classification in relation to other indexing languages', to be held at Herceg Novi in Yugoslavia from 28th June to 1st July, 1971. A number of experts on this subject have been invited to lecture to the symposium. Lectures will be delivered in English or Russian and simultaneously translated into Russian, English and Serbocroatian. For further information contact: Yugoslav Center for Technical and Scientific Documentation, 11001 Belgrade, POB 724, Yugoslavia.

Library Association of Australia

The 16th biennial conference of the Library Association of Australia will be held at the University of Sydney from 23rd to 27th August, 1971. The theme, 'Progress and poverty', provides an opportunity for an assessment of achievements and needs of libraries in Australia.

Distinguished overseas participants will include Dr Jack Brown, National Science Librarian of Canada, Professor Leon Carnovsky of the Graduate Library School of the University of Chicago, and Mrs Barbara Markuson, formerly of the Library of Congress. Mr A. P. Fleming, the new National Librarian of Australia, will also address a plenary session.

The programme includes papers on staff, readers, and materials and material organization in different kinds of libraries, and on other specialized topics, including archives and automation.

Overseas librarians who may be planning to visit Australia at the time of the conference would be welcome to attend. Further information may be obtained from the Conference Secretary, Mr J. Hazell, Library Association of Australia Conference Committee, PO Box 1, Kensington, NSW 2033.

University of Chicago Graduate Library School

From 2nd to 4th August 1971, the University of Chicago Graduate Library School will hold its 35th annual conference at the Center for Continuing Education (1307 East 60th Street, Chicago). The topic will be 'Operations Research: Implications for Libraries.'

The conference is expected to be of particular interest to those concerned with the planning of library services, problems of operational decisions in library management, and library education. For further information contact: Graduate Library School, University of Chicago, 1100 East 57th Street, Chicago, Ill. 60637.

Survey of electronics libraries

The Library Association is currently conducting a survey of special libraries and information services within the field of electronics. The survey is one of a series being undertaken to collect reliable information about the staffing of special libraries and the extent of the services offered. Two questionnaires are being used. The first is concerned with the organization and staff in general, while the second is addressed to individual members of the staff engaged on professional duties in librarianship and information work.

Further details can be obtained from Mr M. J. de C. Hamilton, Assistant Secretary of the LA, who is conducting the survey.

Cataloguers' cameras

In the October 1970 issue (p.476–8) we published an item, contributed by Mr J. Roland Smith, about the 35mm camera used for compiling lists of references at the UKAEA Reactor Group Information Section at Risley. Members interested in this item may also be interested in an article on this subject in a recent issue of *Microdoc*, Journal of the Microfilm Association of Great Britain (vol.10, no.1, 1971, p.6–9).

Entitled 'Cataloguers' cameras' by D. Kennedy, the article takes a look at several cameras, including the Risley camera, which have been developed for use by cataloguers in this country and in the US. Comparisons are made between them and comments are also made on the economics of the various systems in use. Copies are obtainable from: MAGB, 109 Kingsway, London WC2.

NLL Review

Vol.1, no.1, January 1971, of the *NLL Review* has been published by the National Lending Library for Science and Technology. The periodical includes articles, news of NLL activities, details of courses to be held at NLL, new literature (such as Russian book translations recently published by the NLL) and a select list of NLL translations (the full list being announced in the *NLL Announcement Bulletin*). The *Review* is intended to be of value both to those who are relying increasingly on the NLL's services and to those who are considering whether similar services should be created elsewhere.

It is published quarterly by HMSO, price 50p per issue, annual subscription £2.18.

British Technology Index

British Technology Index is now available in the form of industry compatible 7-track magnetic tape obtainable in advance of the printed publication. The tape data contains the usual markers to facilitate rearrangement by author, title, or source journal. A full specification may be obtained from the BTI Editorial Office, Argyle House, 29 Euston Road, London NW1 2SS. (01-837 3222).

SCISEARCH

A publicly available system for interactive access to current articles in about 2,500 of the world's major scientific and technical journals was recently announced by the Institute for Scientific Information and Cybernet Time Sharing Limited. Called SCISEARCH, the system makes available information on the 20,000 most recently published major scientific articles. The information is recorded each week on magnetic tapes by ISI in Philadelphia and then transferred to Cybernet's office in London, where it is stored on a time-sharing computer.

The main feature of the system is its 'command language' which allows the subscriber to specify a search for any words, proper names, journal titles, etc., thus avoiding the use of key words. To use the service the subscriber must have access to a teletype terminal connected to an ordinary telephone line. The cost of a typical search is about £1.

Further information is available from Mr Cawkell at ISI (Europe), 132 High Street, Uxbridge, Middlesex.

Mechanized Information Services

The Library of the University of Aston in Birmingham has recently issued a brief guide to mechanized information services available to UK users. Although produced in response to requests from the University Library's users, the guide is also available to other libraries.

The purpose of the guide is to provide brief details of the range of services offered, e.g. SDI and retrospective searching services, machine-readable data on magnetic tape and punched cards, computer produced sheets, cards, microfiche and microfilm. The organizations are listed in alphabetical order and names and abbreviations are indexed at the end of the guide. The University Library already acts as an advisory and information centre for these services and keeps files of service leaflets and application forms.

For further information contact: J. H. Seals, Sub-Librarian, The Library, University of Aston in Birmingham, Gosta Green, Birmingham B4 7ET.

R & D Projects in Documentation and Librarianship

In February 1971, the FID Secretariat started *Research and Development Projects in Documentation and Librarianship*, a publication of the FID Referral Service (FID/RRS) initiated in 1970 at the FID Secretariat.

The service covers completed, ongoing and planned research and development projects in documentation, information science, librarianship and related fields. The FID/RRS has so far collected and stored data on about one thousand R & D projects, from thirty countries, carried out since the beginning of 1968.

Data are collected through scanning the literature and through questionnaires sent to those engaged in research projects. The FID/RRS offers the following services:

(a) *Current awareness service:* a monthly list of R & D projects; tentative subscription for 1971: 50 Dutch guilders.

(b) *Retrospective searches:* information collected is available to inquirers at the tentative prices of 10 Dutch guilders for the first project, and 5 Dutch guilders for each additional project

Further details are obtainable from: FID, 7 Hofweg, The Hague, Netherlands.

Information required in title leaves of books

The latest British Standard in the field of documentation is BS 4719, *Title leaves of a book*, which has been agreed by a committee representing publishers, printers, librarians and documentalists. The standard lists the information which is required by librarians and cataloguers in the title leaves and provides notes for the publisher on how this information should be presented. It includes recommendations for the dating of books which constituted Part 2 of BS 1413: 1947 *Book sizes and dating of books,* but which have been omitted from revisions of that standard. The standard is based on a recommendation of the International Organization for Standardization (ISO).

Copies of BS 4719 are obtainable from the BSI Sales Branch, 101 Pentonville Road, London N1 9ND. Price 35p (30p to subscribers).

Steel Castings Abstracts

From January 1971 the Steel Castings Research and Trade Association (SCRATA) has placed on sale to non-members of the Association *Steel Castings Abstracts.* The journal appears six times a year and each issue contains about 250 abstracts surveying the world literature on steelfoundry technology and allied subjects. To provide this coverage about 250 technical periodicals in nineteen different languages are scanned by the SCRATA Information Section. An annual author and subject index is also provided.

The annual subscription is £10. Further enquiries should be addressed to: The Information Officer, Steel Castings Research and Trade Association, East Bank Road, Sheffield S2 3PT.

The fire at Goldsmiths' College Library

The Library of Goldsmiths' College, New Cross, London SE14, was severely damaged by fire recently. About a third of the main bookstock, totalling almost 25,000 books and bound periodicals, was destroyed, leaving over 1,400 students without virtually all the books in their main subjects of study.

The collection was mainly at undergraduate level for students reading for first degrees in the following subjects: mathematics, physics, chemistry, botany, history, geography. The library also serves students taking teacher-training courses in the same subjects, together with handicraft, physical education, movement and drama. Among the periodicals lost are complete, or nearly complete, runs of *Nature, New Scientist, Journal of the Institute of Mathematics, Journal of Physics* (series A, B and C), *Current Chemical Papers, Quarterly Review of Biology, Journal of Biological Chemistry, Plant Physiology, Journal of Zoology, Studio International, British Journal of Photography, Geographical Review, Bulletin of the Geological Society of America, Archaeologica Cantiana.*

Any librarian who could offer the College any books or journals likely to help in rebuilding the lost collection is invited to get in touch with the College Librarian, Miss E. M. Moys. Because of the immediate shortage of space, it would be appreciated if lists could be sent in the first instance. The library intends to produce a list of the most urgently needed journals, as soon as possible, but in the meantime the library staff would be glad to provide further details of the type of material that would be useful. (Telephone number: 01-692 7171.)

RECON Terminal at the Technology Reports Centre

As announced in the January 1971 issue of the *Proceedings* (p.6) the Technology Reports Centre (TRC) at St Mary Cray operates a RECON terminal to the ESRO Space Documentation Service database. The facilities afforded by this terminal were demonstrated recently to the press and representatives from the aerospace industry. Searches on the database (references from NASA *Scientific and Technical Aerospace Reports* and *International Aerospace Abstracts* journals) can be by subject, corporate source, or personal author, or combinations of these. Searches can be limited by year or to a certain number of references and can be restricted to reports or journal references only. The terminal operator can view references retrieved on a display screen to check their validity and, when satisfied, command a print-out on a high-speed printer. The print-out shows the NASA accession number, other reference numbers, title, notation of content (an expanding title), authors, corporate source, date, journal reference and indexing terms. Reports and journal articles listed in search print-outs can be obtained from TRC (reports only), or from the NLL.

Charges for searches are £37.50 per search for industrial organizations and £23 per search to academic institutions.

Further information on the use of the TRC RECON terminal can be obtained from Technology Reports Centre, Station Square House, St Mary Cray, Orpington, Kent, BR5 3RE. (Tel: Orpington 32111, Ext 26. Telex 896866.)

Non Print Media Group of ASIS

A Special Interest Group for Non Print Media (SIG/NPM) was formed at the 33rd annual meeting of the American Society for Information Science (ASIS) held from 11th to 15th October, 1970, in Philadelphia, Pa. The purpose and goals of this group are to help bring about a universally accepted system of cataloguing and classification for non-print media and to help develop standards, common terminology and to encourage research in the non-print media field. The interim executive board of the new group consists of: B. Eugene Koskey, Chairman, University of Wisconsin, Milwaukee; George L. Abbott, Syracuse University; and Mrs Evelyn Clement, Indiana University. Membership is available through the American Society for Information Science, 1140 Connecticut Ave, NW, Suite 804, Washington DC, 20036.

BRIEF REVIEWS

BUTTRESS, F.A., *comp.* World guide to abbreviations of organizations. 4th edition. London: Leonard Hill, 1971. 337 pp. £5.50. (ISBN 0 249 44072 5)

This is the fourth edition of a publication which was formerly entitled *World List of Abbreviations* and it includes approximately 3,000 additional items. It does not claim to be comprehensive: Russian abbreviations, for example, are not included but reference is made in the introduction to various useful publications for tracing such abbreviations. Once again in this edition, the editor says that to keep the publication within a reasonable size and price, addresses are not included; however, bibliographical details of a number of publications, which do provide this information, are given. As many directories listing the full addresses of organizations do not list abbreviations, this publication, like many others of its kind, is a useful first step in expanding abbreviations.

CAMBRIDGE UNIVERSITY LIBRARY. Current Serials available in the University Library and in other Libraries connected with the University, 1970. Cambridge: University Library, 1971. 1014 pp. £5.00. (ISBN 0 902205 01 3)

This list formerly called *Current Periodicals* has, as the change of title indicates, been extended in scope to include series; in addition many more government publications are listed. As well as periodicals and newspapers it includes reports' series, bulletins, etc. of societies, institutions and government departments; law reports, session cases and numbered series of monographs.

Titles are listed alphabetically and the holdings of 97 Departmental and College Libraries are included as well as those of the main University Library. Each entry in the list gives the short title, place of publication, if it is not London, and the date of publication of the first volume in the library.

The holdings of the University Library in this list are correct to 31st October 1970.

WOODWORTH, DAVID, *comp.* Guide to current British journals. London: Library Association, 1970. 269 pp. £5 (£4 to LA members). (SBN 85365 2244)

This work is designed to provide a quick reference source for the identification and publication details of current British journals, and of some important journals from the Irish Republic.

The first edition appeared in 1962, but it is now intended to produce a new edition every three years. Some radical changes have occurred in this edition. Firstly, the entries, which are given running numbers throughout, are classified into subject section by UDC, rather than modified Dewey. Secondly, the alphabetical index refers to entry numbers, rather than classification. The form of entry is also altered, changes including a symbol for level of appeal, brief details of subject coverage as supplied by publisher or experts where possible, and circulation. Where a particular issue of a journal has been analysed, its date is given.

In spite of some peculiar inconsistencies in the journals covered—for example, the *Economist* is included, but *New Society* and *New Statesman* are not—this guide should be found useful within a collection of such reference books.

LIBRARY THEORY AND PRACTICAL VOCATIONAL TRAINING: A FORUM

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1. B. J. WILSON, *Assistant Secretary (Administration), Central Electricity Generating Board*

Introductory remarks: Training and the industrial employer

The reason that I am here opening the forum this evening is that in October 1969 at a Joint Seminar on the Training of Teachers and Librarians, held at the London University Research Unit for Student Problems, I broke, after fifteen years in the information world, my rule of keeping silent! I was then silly enough to write something as well, and hence here I am. What is more, I am now here under false pretences because, since my invitation to speak on this forum, I have left information work as such and am now an administrator full time. However, I still have a considerable responsibility for, and interest in, the recruitment of library staff.

May I start by saying something which I have said before: that the library schools in general, with their emphasis on education for librarianship rather than training as librarians, are not speaking on the same wavelength as employers, particularly industrial employers of librarians who bulk the largest numerically. It is my experience that many of the newly-qualified librarians coming from the schools do not have their feet on the ground in terms of providing a practical, day-to-day service to their customers (and that is what library users are, whether you like it or not) and that their theoretical library training has given them the impression that librarianship is an end in itself, rather than a means of providing such a service. I must emphasize that this library work is service work and nothing more nor less.

Now to mention a number of more specific points which may be of use in getting the discussion flowing well. May I say here to those young librarians and students who may be present that my comments are in no way criticisms of them, but more of the type of education that they have received at the library schools!

It has been found, in the experience of my colleagues and myself, that many newly-qualified library staff have very little idea of the nature, structure and functions of different types of industrial organizations and establishments, both of a public and private nature, in relation to the information requirements of those organizations and establishments. Perhaps some emphasis needs to be given to this subject during their training. Different types of employer are likely to require different types of information. As an example of the necessity for this background, one may take stock selection and acquisition as affected by the environmental factors of the employing organization. What should the librarian buy, and what will be used?

The budgetary aspects of librarianship are mentioned in the Library Association syllabus for academic libraries' and for public libraries' papers, but not for special libraries' papers. I feel strongly that even newly-qualified librarians should have some idea of the methods of financial control used in industry, how contracts are arranged and how suitable sources of supply are chosen. There are many pressures on, and many calls for, spending of money in industry, and the librarians must be prepared for these pressures and, of course, to fit in with purchase office procedures in use in their industries.

Some library schools, I know, now include in their courses exercises in job analysis and specifications, communication and simulation studies, but not all by any means, and I consider that this is an important aspect of library training which is not being given sufficient emphasis. Even the newly-qualified need to know something about library management. Many of them go straight from library schools to single-handed, if I may call them that, posts. (In parenthesis here, I wish the library schools would try to persuade both employers and students not to take this sort of post immediately after leaving library school—it is in my view essential that the first post for the vast majority of students should be as one of a team in a fairly large library.) However, immediately a librarian is in charge of one member of staff, he or she has to put some library management into operation, and most who are in this position have very little idea where to start.

It has become obvious too that, whilst at library school, students are given far too few opportunities of handling real-life enquiries, both bibliographical and subject enquiries. The Library Association examinations do not test the ability of candidates actually to use sources of information, and we are time and time again appalled at the lack of knowledge of, for example, abstracts periodicals, shown by newly-qualified library staff. (In parenthesis again, we are appalled also by the lack of knowledge of these sources of information by science graduates!)

To be a little more positive, one possible way of alleviating some of these difficulties might be for more exchange of staff, I repeat staff, between special, particularly industrial, libraries and library schools. I have the feeling, shared I am sure by other employers, that some of the staff of the library schools are themselves not sufficiently experienced in the work of different types of libraries.

To sum up, generally my feeling is that, although library students are taught the library techniques carefully and rather specifically, they are not given sufficient instruction or experience in the application of common sense to the use of those techniques in practice, particularly in the industrial environment. Staff working in industry have to realize that, both in the public and private sector, services of all sorts have to be paid for, and that they must therefore be in a position to justify the services that they provide for the organization concerned.

2. D. J. FOSKETT, *Librarian, University of London Institute of Education*

Professional Education

The relation between theory and practice is one of the most difficult problems confronting all who are concerned with preparing and conducting initial courses in a professional activity. There are three major factors to be considered (apart from many other minor, from the point of view of education, considerations, such as the availability of grants). These may be briefly summarized as follows:

(1) The needs of the student.
(2) The needs of the employer.
(3) The needs of the profession.

(1) *The needs of the student*, who has probably begun his course with a minimum of practical experience, consist of, above all, a thorough grounding in all those areas of professional activity in which he will be required to operate and, in due course, to make decisions. Since he is intending to be a 'professional', it is likely that he will reach a post in which he is given a certain amount of managerial responsibility fairly soon after the completion of his course. He has therefore to be given a *convincing* account of what things are done in the name of professional activity, why they are done in the particular manner in which they are done, and what principles of organization have to be called upon in order to see that they are done. This means that he must receive a *reasonable* account; it is not sufficient for him to be told that such and such is the case, and for him to memorize these facts. He has to assimilate a whole structure of rational discourse into his own understanding, in order that he may arrive at a degree of professional judgement. This is particularly true in the present age, when library and information services are going through a period of rapid transition, and the methods in use even five years ago may well be entirely obsolete by the time that the new student reaches his first position of authority.

(2) *The needs of the employer*, on the other hand, actually conflict with these requirements to some extent. We can accept, I think, that the employer would be very pleased to receive from the School of Librarianship young would-be professionals who are mentally alert and vigorous, full of knowledge about the very latest advances in techniques, and at the same time malleable and amenable to the practical instruction of those who have been in the system for some time and are already in positions of authority. But the employer also wants more than this: he wants to recruit from the schools new employees who can be immediately posted to a particular job, having the ability to do that job with an absolute minimum of instruction from the employer. That these two aspirations are in conflict can easily be seen from the professional literature, in which the arguments from both sides are laid out in more or less detail from time to time.

(3) *The needs of the profession*, though they come third on my list, of course determine the basic requirements of the other two categories. The management of a library and information service is not an end in itself, though we may on occasion like to think so. I might well have called this category the 'needs of users', but I deliberately did not do so because this, while in principle perfectly accurate as a description of the category, also opens up a whole area of discussion which on this occasion I wish to avoid; but I must emphasize that the needs of the profession do, in fact, derive from the needs of users, as I am sure nobody would question. My estimation of the needs of the profession, therefore, are that it should, as a corporate body, that is, a professional association, have a full awareness of what its corporate role is in relation to the needs of the society

which it serves. It should have the social responsibility for ensuring that its members are thoroughly motivated by the desire to provide for these needs at the highest level of professional competence, that is, that it should be the guardian of the professional conscience; it should therefore also have the responsibility of maintaining professional standards of performance, that is, as a corporate body it should be continuously watching over the development of practical methods of implementing professional aims. The identification of aims is also a matter for professional discussion, and we must be able to expect the younger members of the profession to bring a critical eye to current formulation of aims, and the possible need for their modification in the light of changing social circumstances and beliefs.

An institution setting up an initial course, therefore, has a responsibility not only to the student who is being taught and the employer who is the cash customer for the product, but also to a generalized body of professional knowledge and wisdom represented (to some extent) by the professional association. To the extent that this body is generalized, it has to be theoretical, and in respect of library and information service, the next questions we have to ask ourselves are: Is there such a generalized body of theoretical knowledge to be imparted to the students? If there is, what are its components? If there is not, should there be?

Obviously, one cannot answer these questions with a mere 'yes' or 'no'; what is equally obvious is that one can only give them the most cursory treatment in a discussion such as this. My own view, baldly stated, is that the task of the school is *to inculcate an attitude of mind rather than produce a walking encyclopaedia of factual information*; that is, the student must be given a professional awareness, a conceptual framework through which he can bring professional judgement to bear upon the practical problems that he will meet. I do not think that it is the role of the schools to develop practical skills to a high pitch of excellence, since I believe that this can only be done in the actual working situation. I have developed these arguments at somewhat greater length in my article on 'The intellectual and social challenge of the library service', published in the *Library Association Record* for December 1968. My reason for taking this stand is that, since professional activities are devoted to the service of social needs, and are not ends in themselves, learning about professional activities is not merely a process of being instructed in certain practices that have won common acceptance. The young entrant's scrutiny of professional practice is not that of the apprentice learning how to handle tools, though there is an element of this in it; it is rather that of the 'academic' exploration of the type of product that is required, which will bring with it a keener understanding of the function of the tools, and of their appropriateness for that function. If this attitude of mind is developed in the student, I suggest that he will be highly motivated towards acquiring excellence in practical skill, and will set about his work, when he comes into employment, with that eagerness and sense of devotion which also characterizes the professional mind. I cannot see that this sort of attitude will be developed in a school which concentrates on the 'how-to-do-it' approach, teaching practical skills without the true professional foundation studies. As we all know, it is more than likely that a student coming from such a school will obtain a post in a library which does not use those methods at all.

This is emphasized by the rapidity with which the professional scene is actually changing today. In such circumstances it seems to me to be absolutely vital that those who are going to be in charge of affairs in ten or twenty years' time must, at this stage, be bringing a sound theoretical approach to the analysis of problems, rather than tackling them in a purely pragmatic, or 'bull-at-a-gate' manner. In my view, the history of the application of computers to library and information services is one long trail of disasters; after twenty years, we have only just arrived at the stage when we can honestly say that there are systems available that are really worth adopting. Yet the professional literature is full of accounts of this, that, or the other system which purports to have found the answer. It is therefore in the immediate interests of both the student and the profession that the initial course should consist of a sound theoretical training; I suggest, furthermore, that it is in the not-too-long term interests of the employers also, though it will inevitably mean that they will have to devote more time to practical instruction when the newcomer arrives. The new Library Association Certificate of Practical Competence aims at formalizing the post-examination year of such practical training, giving it an importance and status that it has not had hitherto.

You may gather from this that I am in favour of increasing the autonomy of the schools, that I envisage the future of professional education as being more of the 'university' type than of the vocational training type, though I also believe that there may well develop the need for more than one type of professional, and therefore more than one type of professional education. These are, of course, questions which it is not up to the schools to decide by themselves. The professional associations must always have a large say in the matter, since they are the people who are in the closest day-to-day touch with users. Not the least difficulty facing those who are educators of professionals, indeed, is that they are not themselves in such daily contact with users. But they are aware of the educational needs and aspirations of the students, and they are aware of the educational validity of the differing types of course. By a continuous dialogue, with the full and frank exchange of views that can be achieved by meetings such as this, I believe that the different, and sometimes apparently conflicting, wishes of the various branches of the profession can be reconciled, provided, of course, that each branch looks to the furtherance of *users'* needs, represented by the professional view, rather than the mere satisfaction of its own specific interests.

PROFESSOR W. L. SAUNDERS *Director, Postgraduate School of Librarianship and Information Science, University of Sheffield*

The Library Schools: aims and objectives

My situation this evening reminds me of that of the young curate who was being dressed down by his vicar. After listing all the curate's faults and shortcomings, the vicar said: 'And finally, please do *not* refer to the congregation as the opposition'. I do assure you that nothing I shall say implies that we in the library schools regard the *employers* as 'the opposition'.

I must start this short paper with a disclaimer. Even if all the library schools spoke with one voice on the matters I shall be discussing—and this I very much doubt—it would be presumptuous for me to claim to speak for all of them. I hope and believe that most of them would share a good many of my views, but mine is certainly not the only way of looking at things, and it is quite a comfort for me to know that a good many of my library school colleagues are likely to be in this audience and able, therefore, to put different viewpoints forward if they so wish.

My brief from the meeting organizer is to talk about the aims of the library schools and the sort of person they try to turn out, with particular reference to postgraduates. It might be useful therefore if I start by examining—or, rather asserting—what I believe to be one of the basic assumptions behind a library school's activities; indeed, behind its very existence. It is that a hall-mark of any true profession is a body of general principles, a theoretical framework, which supports and guides the actual *practice* of that profession. To an individual practitioner this framework, these guiding principles, may become more and more shadowy, may be pushed further and further into his subconscious, with the passage of time and the accumulation of experience on the job. But whether he be architect, engineer, doctor, lawyer—or librarian—this sort of knowledge is an indispensable element in his professional equipment, an indispensable basis for the practice of his profession.

I would also suggest that if knowledge of this theoretical framework, of these general principles, is to be transmitted and absorbed to maximum effect at the training stage, it needs to be illuminated at appropriate points in time by actual practice, by suitable experience of the theory and principles in operation.

Now if you believe library and information work to *be* a professional activity, I think it follows that you must accept in essence what I have said so far; and if you do, the practical point then arises—where and how does our potential professional *acquire* this knowledge and experience? The answer, in this country, is that the *practical experience* element is gained by 'in-service' training in library and information units; and that the major responsibility for transmitting *theory and principles* falls on the library schools.

Concern with theory and principles is therefore a proper, indeed, a major concern of the library schools, just as it is a proper and major concern of medical schools, engineering schools or architectural schools. I think it is failure to appreciate this basic point which is at the root of some of the misunderstandings that arise between the schools and employers.

With this in mind, I now propose to consider some of the constraints under which the schools operate in trying to carry out the task that I have just indicated. I believe that a proper appreciation of these constraints will go a long way towards revealing not only the schools' *problems* but their aims and objectives.

Taking our small school in Sheffield as an example, thirty-nine graduates passed out last year. Some went to university libraries, some to polytechnics, some to public libraries, some to industrial library and information units, two went to the BNB and two into research units—six different groups, in fact; and even within each of these groups, the type of task which faced one of these graduates on this first appointment often varied enormously—for example, one of the public library appointees is in charge of two small branch libraries; another is working in the local history collection of a large city reference library; one of the BNB appointees is involved in the implementation of PRECIS, while the other is on totally different BNB work.

The point I am making is that the students graduating each year from any library school go to a very great variety of posts. Add to this the fact that until they are appointed to a job, which is usually near the end of the library school course, they do not know what the requirements of that particular job will be; add to that the fact that during the course of their training in the school they may completely change their original ideas about the type of library or unit they wish to go to; add to that the fact that there is an undoubted—and very desirable—increase in mobility, not only between individual library and information units, but between different *sectors* of library and information work, and you will surely appreciate that tailoring a student's course to meet exactly the requirements of his first job is quite impossible, even if it were desirable: which in my view it isn't! This, then, is the first constraint: the tremendous range of jobs that students are likely to take up, and the need to facilitate their subsequent mobility within the profession.

The second constraint is the *brevity* of the library school course, particularly in the case of graduates. One year—even if it is a full calendar year, as with our Masters' degree courses at Sheffield—is a very short time in relation to the sixteen years or so which a graduate has already spent in full-time education before he goes to library school. I think we should all keep this in mind when apportioning either blame or credit to the library schools for the calibre and performance of their graduates. When a young man comes to library school he is, educationally speaking, nearly a finished product. The subject-knowledge of a graduate chemist, for example, has already been acquired before he comes near a library school; though of course one of the many tasks of the library school is to orientate this subject-knowledge towards the needs of library and information work.

The third constraint is the enormous and rapidly increasing variety of knowledge that is the legitimate concern of present-day library and information studies: from management to historical bibliography, from statistics to classification and indexing, from computer applications to literature searching. And most of this, for practical purposes, is *new* knowledge so far as the graduate is concerned.

All of this, then, and a year to do it in! In consequence, a major preoccupation of the library school syllabus maker is with *choice*: what to put in and what to leave out. And having decided what to put in, to what degree of depth it is feasible and desirable to pursue each topic: and feasibility and desirability are more or less inevitably in conflict with one another.

The fourth constraint is one that Roy Stokes often emphasized. The schools are responsible for the professional education and training of those who will be running our library and information services in twenty, thirty or forty years' time, and they have a consequent responsibility to take some account, at least, of the professional needs and opportunities of the future. Employers, on the other hand, are naturally concerned to a large degree with the effective day-to-day running of their units in the here and now—today. Here again is scope for misunderstanding and, to some extent, conflict.

Finally, under constraints—though this is really the wrong word for it—I would mention the conviction, strongly and properly held in most schools, that teaching methods should wherever possible encourage students to think and find out for themselves, rather than sit back for hour after hour, taking in knowledge from formal lectures. This is undoubtedly educationally sound, but it almost always imposes a further limitation on the amount of ground that can be covered within the year's teaching programme.

The constraints I have mentioned—the range of jobs to be prepared for, the large number of topics to be covered, the limited amount of time available to do it in—force the schools to look for and concentrate on the *essentials*, and in particular to search for essential principles. This is certainly as it should be: as I said earlier, the library school stage in a librarian's professional education is the point at which he should above all be acquiring his knowledge of the theoretical basis and framework of his profession.

A consequence of all of this is that the present-day library school is much more concerned with 'why' than with 'how'. It is likely to focus a great deal of attention on *objectives* and on developing appropriate attitudes, to try to make a budding professional aware of the purpose, role and potential contribution of library and information services. The importance of techniques of all sorts, as the *means* to the desired ends and objectives, is certainly not underestimated, and a lot of attention is likely to be focused on the various alternative routes and possibilities that are available to a librarian facing a particular need or problem, and also on the relative merits of these alternatives in particular situations. This awareness of alternatives, in my view, is one of the principal differences between someone who has had a professional education and someone who has picked it up on the job. The amount of time available for actually *practising* techniques in library school—whether they be abstracting, indexing, computer programming or any other skill of this sort—is likely to be strictly limited, except perhaps in one or two areas of specialization.

It therefore follows that the employer who expects the library schools to produce for him 'instant' cataloguers, 'instant' computer programmers, 'instant' abstractors, is likely to be disappointed. What the employer is entitled to expect is someone with enough grounding in basic principles, enough awareness of his library or information unit's objectives, and enough understanding of the essentials of any of the tasks he is likely to be called upon to perform, to be able quite quickly to become a useful, productive member of the staff of the unit in question. But the real benefit of professional education is more likely to be apparent after five or six years than after five or six months. The employer himself, as I implied at the beginning, has his own indispensable contribution to make to the graduate's professional preparation; it is, above all, to provide the on-the-job training element—before library school, if possible; sometimes for a short period *during* the library school course; and finally, for a suitable period of time *after* library school.

It is possible that I have over-emphasized the schools' concern with theory and principles, and I would stress that nothing I have said should be taken to imply that in the library schools we are feet-off-the-ground theorists with no awareness of the practical facts of professional life. On the contrary, library school staff have normally had considerable successful experience at a senior level, as practitioners; their work takes most of them into a wide range of operational library and information units, they do a great deal of work on professional committees, and they are being looked to increasingly by practising librarians for consultancy and advice. If library school staff are doing their jobs properly they will be right on top of best current practice, and in their own particular way will be contributing a full share to general professional leadership.

What I suppose this all adds up to is that the schools aim, all in their different ways, to give a good, basic, *general* professional education. They do not train for specific jobs, they do not even train for specific sectors, such as law libraries or medical libraries. (I would say in passing that I believe one of the gaps in our present set-up to be the lack of provision of adequate, high-quality *post*-qualification training of a specialized nature, for experienced and qualified librarians.) I think most of us would agree with Peter New that our present approach produces students who are less immediately competent than previous generations of students who absorbed facts given to them by enumerative teaching. On the other hand, I would expect the professional education of our present students to be bearing dividends for much longer and in a rather more profound way than was the case with their predecessors.

I would conclude by stating my own belief that given the present social, economic and educational context, the right approach for the schools is to aim at providing a really sound basis of theory and principles, illuminated not by the practice of just one library, however good, but by the systematic study of all that is best in contemporary librarianship and information work. If the employers, for their part, take responsibility for the essential on-the-job element of *practical* training, then the end products of this combined operation should be real professionals, in whose hands we can confidently place the running of the library and information services of the last decades of the twentieth century.

DISCUSSION

MR D. E. DAVINSON (Leeds Polytechnic) said that Mr Wilson had criticized the schools of librarianship for not doing something which they did not set out to do. He referred to 'training' throughout his talk. Library schools did not train *in* librarianship, they educated *for* librarianship. Whilst it would be possible for them to train specifically for one library, to do so would be to limit their students to that library alone. In fact industry was presently doing least to create conditions to assist their staff to qualify as librarians. They preferred to obtain their senior staff 'off the peg'. The reference to the need for library school lecturers to 'try to persuade students not to take posts where they will have considerable initial responsibility' was a nonsense. It was not library school lecturers who appointed students to posts, it was employers and if Mr Wilson took people on despite his obvious lack of faith in library schools, it was his affair. He appreciated Mr Wilson's concern for the lack of experience of library school lecturers: it was a concern shared by many librarians who, however, seemed to have no doubts as to *their* ability to lecture effectively, using all of the best educational methods. To suggest librarian/lecturer exchanges was quite easy, but it was not usually practical for quite opposite reasons to those held by many librarians—in fact library schools would be very chary of taking on many librarians as temporary lecturers, because of reservations about their ability to teach.

MRS E. MACK (CEGB) said that the employer in industry was *not* a librarian, but a management executive, who thought that by employing a library-school qualified individual, he would have someone who could carry out professional duties. When he found this was not the case, he would employ unqualified staff in future.

MRS I. V. WHITE (National Physical Laboratory) said that her complaint was not that she had to train young people who came to her from library school, but that these young people thought they were trained and therefore resented supervision. The library school should make it clear that training commences in the first job.

MR R. A. FAIRTHORNE (Independent) said that one marked difference between the library school graduate and a science, medical, engineering, or whatever, graduate was that he was plunged at once into running a department entirely on his own. Most industrial libraries were run by, statistically speaking between 1.5–2.5 professional librarians, with no other librarians for help, comfort or guidance within miles. Other graduates entering industry began in a fairly lowly position, in an environment of people in their own line of work, from whom they learned local habits, outlooks and skills. A librarian, to do his job, must know how his customers ask for things, and what things they ask for. He could not learn these for every possible activity before taking a particular job.

MR E. DUDLEY (North-Western Polytechnic School of Librarianship) stressed the role of the library in demonstrating the relationship between its practices and properly formulated principles, and the importance of employing libraries attempting to understand the *values* of young professional librarians—'The times they are a-changing'.

MR P. G. NEW (North-Western Polytechnic School of Librarianship) replied to the point that library schools should ensure in selection that students have such attitudes as accuracy, ability to alphabetize, etc. This could not be found out at selection interviews. Any direct question would produce the answer 'yes'. A test would not be acceptable.

MISS S. FITZGERALD (Ministry of Agriculture, Fisheries and Food) said that 'rounding off' was very important, as it not only helped the student, but was profitable to the employer: it resulted in better motivation, more commitment, and improved performance on the job. This tied up with the point raised earlier by Mr Wilson, on the need for librarians to have some grounding in general management principles.

MR D. KENNINGTON (GLC) said that employers needed to have more responsibility for allowing creativity among new employees—for developing themselves fully and for not making jobs as small as possible. Jobs should rather be expanding so that individuals could 'grow' and so that their zeal developed at library schools was not stifled. More and better induction courses were needed within organizations.

MR J. ALLRED (Leeds Polytechnic) said that the Leeds Polytechnic' Department of Librarianship was experimenting with aptitude tests for entrants to librarianship. The difficulty was that there was no consensus of opinion about the qualities of a good librarian, possibly because of the wide variety of library work and kinds of people who did it. Motivation might produce the right connection with training. A correctly motivated student would *want* to acquire the skills to do the job, and his employers should provide the facilities. Also, in the student's immaturity, motivation might well show as conceit or too large a measure of self-confidence.

MR F. HOGG (College of Librarianship, Wales) said that schools did not set out to produce perfectly 'finished' librarians. All librarians were 'students' and their education should be continuous. However, Mr Wilson seemed to be suggesting that he expected a finished product capable of successfully completing, *without further training*, any job in his library. He did not think it would be possible to educate and train a student to such a pitch, so that he had 'nothing more to learn' after leaving library school, and if Mr Wilson had discovered a way of accomplishing this, he should share his secret. Was he implying that any 'student', after a period of training in his library, would be so perfectly 'finished' that 'the student's' next employers could expect that 'the student' could carry out *any* task with expertise?

MR A. E. STANDLEY (West London College) said that librarianship and the present UK educational system for librarianship were relatively new. It was early days to judge the products of schools. Industrial libraries were of many types, some very large, some very small. Perhaps they, more than most, were in need of part-time *training* courses for their library staff, in particular techniques as well as in general library education.

MR D. F. REARDON (Birmingham Polytechnic) asked if Mr Wilson was generalizing from particular instances in his criticisms of the students produced from the library schools, or was he speaking from results of a general survey. An implication in Mr Wilson's talk was that training for specific jobs should be given at library schools. The best way that this could be done was by placing students in specific types of library for training during their educational period at library school. They had tried this at Birmingham, and tried to place students for an extended period (46 weeks) of training in industrial libraries. They approached such libraries, and had not yet managed to persuade them to take students for such training.

MR D. BAYNES (APV Co. Ltd) said that the industrial branch of the profession was characterized by small units. Could library school leavers reach the 'professional competence', which Mr Foskett had suggested, in these units, where there frequently was not a chartered librarian. More industrial jobs must be created—professional libraries would only be set up as a result of practical evidence from users, perhaps from those moving in from companies with existing information units. Employers wanted their 'money's worth'—say four years of *practical* effort from female school leavers.

Summing-up of Discussion

MR WILSON said that it would be impossible in the time remaining to answer all the interesting points which had been raised in the discussion, but he would make brief comments on some of them.

First, he did not agree that it was inevitable that the employer should have to train the librarian, even the newly-qualified librarian, in his or her library expertise. If an employer engaged, for example, a trained industrial nurse who had roughly the same training period and roughly the same entry qualifications as a librarian, he would expect, for the, perhaps, £1,200 a year which he was paying her, a competent nurse who knew her job. If, during her first day of work, an employee came to her with a crushed thumb, her employer should expect her to be able to deal with this adequately. Similarly, he could see no reason why, if on the first day of employment of a librarian, who was being paid a similar annual salary, an employer came to the library with a request to trace a review article easily found in, for example, *Chemical Abstracts*, the employer should not expect her to be able to do so. He was paying for an expertise which a qualified librarian, like the qualified nurse, should have, and he was entitled to get what he was paying for.

Mr Wilson went on to say that the capital 'P' which he had written on the blackboard during the discussion stood for, not, as some had suggested, 'Personality'—although that indeed is an essential requisite of a librarian—but 'Profession'. At the point in the discussion when he had written it on the board, every library school speaker had by then used the word 'profession', and had used it in the sense requiring a capital 'P'—this was very disturbing, he thought, in a profession which he assumed all were agreed was a service!

He agreed fully with the speaker who said that the trained librarian was a combined product of the library school and of practical work gained with employers, but this practical work should be done during the training period at the school—the employer should not be expected to pay for a qualified product and still have to train him or her. He also agreed that there could well be more co-operation from employers in giving in-service training to library school students during their courses. He thought the problem here was largely a financial one.

In conclusion, Mr Wilson said that there seemed to be a mistaken impression that the 'employers' were industrial librarians. This was not, of course, the case. The employers were the management of industrial organizations in this context. He wondered how many of the library school representatives present had employers, as opposed to industrial librarians, on their advisory councils or similar bodies. It was convenient for industrial librarians, heads of information services, and so on, to be invited to serve on these bodies, and they were very pleased to do so. The employers, if approached direct, would also be likely to send their senior library or information man or woman to sit on such bodies. But this was not what was required. The people who should be sitting as employers' representatives on the advisory committees of library schools and similar bodies ought to be the directors or senior personnel staff from the industrial organizations. Only then should we be one stage further both in finding out exactly what sort of a product industry required in its new librarians, and in discussing with the library schools how this could best be achieved.

MR FOSKETT expressed full sympathy with Mr Wilson's sentiments. He was appalled at the reactions which Mr Wilson's paper had aroused. He believed in the profession and professional education.

PROFESSOR SAUNDERS said that many industrial libraries did not want professional librarians. There was possibly a need for a different type of employee. He appreciated the points made on the selection of students. This was at the heart of the matter.

SUBCODES: AN EXAMINATION OF THEIR UTILITY WITH SPECIAL REFERENCE TO FEATURE CARD SYSTEMS

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Based on a talk presented at a meeting of the Co-ordinate Indexing Group, 19th November 1970

A NUMBER of over-lapping terms have been applied to coding techniques used in association with post-co-ordinate indexing. These include subcodes, which can be interpreted as the generic term; superimposed, graphic and random coding and *Zatacoding*, which are nearly synonymous; and partial or derived coding: the last named may be considered as a bridge between the second group (superimposed, etc.) and direct coding techniques. For the sake of consistency, the terms *graphic coding* and *partial coding* will be employed wherever possible. The general principles of coding have been adequately reviewed in C. P. Bourne's *Methods of Information Handling*[1] and have been subjected to detailed analysis in J. L. Jolley's *Data Study*.[2] Graphic codes have been studied in considerable depth in the above; therefore, a brief introduction will suffice.

Edge-punched cards, and to a lesser extent 80-column cards, have a limited number of coding positions, which imposes severe restrictions upon direct coding. Thus, the typical edge-punched card can accommodate less than one hundred features, or other characteristics, if these are represented by unique punching positions. It should be noted that this characteristic does not apply to optical co-incidence cards or to computer systems where the coding field is, in theory, infinite. Although the technique of subcoding was developed to extend the usefulness of hardware with limited coding fields, it has also been applied, mainly as an ancillary feature, in optical co-incidence systems.

Graphic coding consists of selecting a set number of elements in combination from a fixed coding field. The elements may be letters, numbers or any other coherent symbol (in edge-punched cards the field may be the set of punching positions or subsets of these). The combinations may consist of pairs (digraphs), threes (trigraphs), and so on. The concept can be illustrated by considering a field consisting of the characters ABCDE: if these are selected in pairs, the following unique codes can be produced:

AB	AC	AD	AE
	BC	BD	BE
		CD	CE
			DE

Thus five letters used as digraphs produce twelve codes. The number of combinations possible for any particular coding field (F) using m elements can be found by:

$$\frac{F!}{m!\,(F-m)!}$$

If two or more codes are used simultaneously, there is a danger of noise at the output stage, e.g. in the ABCDE example if AB and CD are used at the same time, then AC, AD, BC and BD will inadvertently be 'coded'. As the coding field is extended the risk of noise falls, especially if the combinations are selected on a random basis, but it is usual to restrict the amount of simultaneous input. Unfortunately input tends to follow defined patterns and this may invalidate the randomization process. Some form of key is necessary to link terms, or other characteristics, to codes.

It is possible to design an optimum system,[3] if an estimate can be made of the eventual number of items within the collection (C), the amount of noise tolerable (R), the lowest number of terms normally used for searching (L) and the highest number of terms used for indexing (M), where:

$\mathrm{R} = E_{\max}/C$

$E_{\max}$ = the maximum amount of noise with L terms

F = length of coding field

m = number of coding elements used in combination

$\langle\rangle$ = implies the nearest integral value

$$m = \left\langle \left(\frac{1}{L}\right)(-\log_2 \mathrm{R}) \right\rangle = \left\langle \left(\frac{1}{L}\right)(3.31)(-\log_{10} \mathrm{R}) \right\rangle$$

and $F = \langle 1.445\, mM \rangle$

Taube[4] developed extensive tables of dropping fractions (noise) based on similar parameters. Use of the tables is extremely simple: the variables consist of code length, field size and number of superimposed entries. Code lengths range from 1 to 6, up to 30 superimposed one element entries are considered, and field size ranges from 10 to 250 and includes 26 (or the standard alphabet). If the input has entirely random characteristics (an unlikely quality in actuality) then system performance can be predicted. This is an unusual characteristic and is not shared by partial coding techniques.

Some of the features peculiar to graphic coding may be illustrated by reference to systems used at the Natural Rubber Producers' Research Association (NRPRA). The first was a now discontinued formulary (a collection of recipes for rubber products). This was maintained on edge-punched cards with 98 effective coding positions. A very limited amount of direct coding was employed and the capacity of the system was greatly extended by the use of several graphic coding fields, the largest of which employed trigraphs in a field of 31 numbers and related to rubber products. The system was circulated to several centres throughout the world and was accompanied by an elegant instruction manual[5] to act as key to the various codes. The key to the most extensive field could be regarded as a minuscule thesaurus as it contained cross-references (e.g. Boots *see* Shoes) and gave quasi-synonymous terms the same code (e.g. Bottle stoppers and Rings, bottle shared the combination 13+20+22). The system performed satisfactorily, but the amount of 'needling' involved needled the users. Consequently it was abandoned, being absorbed into a central feature card system.

The other polygraph system employed at NRPRA acts as an ancillary feature to a normal thesaurus-based, optical co-incidence card system.[6] It is used for handling trade-names and, to a lesser extent, company names. Trigraphs are selected at random, via the tables of random numbers contained in Fisher and Yates,[7] from a field of 50 numbers. The exact reason for establishing a coding field of this size has been forgotten, but it probably seemed to be adequate when the system was started, and on purely empirical grounds this judgement has proved to be successful. Records of the combinations adopted are maintained on 48 graphs (one for each possible initial numeral in the trigraphs): therefore, each combination used is, in theory, unique—in actual practice duplicate combinations are rarely noted from the random source. A maximum of six combinations may be used simultaneously and the indexing slips are designed to accommodate up to this number of terms and corresponding codes. This imposed limitation necessitates that a few documents require more than one entry for this reason alone. A separate index (i.e. separate from the thesaurus) is maintained to link terms with codes and this, like the thesaurus, is maintained on 6 inch × 4 inch cards.

The system now contains 12,000 items and about 1,200 trigraph combinations have been used. The graphs noting combinations have permitted a few rudimentary tests to be performed on the first deck of 10,000 capacity feature cards. 315 theoretically unused combinations were selected at random from the graph sheets. The feature cards corresponding to each of the 315 trigraphs were superimposed on a light-box in turn, and the number of holes showing light through were counted. The theoretically 'unused' combinations produced an average of 5.6 postings—all presumably noise. The highest figure in the sample was 18 and zero was attained twice. The cards representing the elements of the graphic coding averaged 207 postings: cards were selected at random and the highest number of postings per card was 258 and the lowest was 156. If all the cards had been punched to capacity (that is with the maximum of six trigraphs per item indexed being taken into account) approximately 97 items would be produced as noise on each search.

Searches are not normally performed on the basis of a single trigraph combination, but are usually so organized that trigraphs are combined with a thesaural term. No index entries consist solely of trigraphs and most of the trade-names are related to function and chemical composition (with the instruction to 'post-on' in the case of the latter: function may vary). Therefore, noise in real-life searches is very low and in actuality the subcodes seen in *this light* may be considered as precision devices. The effect of combining trigraphs with thesaural terms can be illustrated by reference to one of the most frequently used NRPRA combinations. The trade-name *Nonox ZA* (an ICI antidegradant for rubber) has the combination 11+17+26 allotted to it. Used on its own, this produced an output of 65 items. When coupled with the term antidegradants the output falls to 59, and if this is augmented by *p phenylenediamines* the output falls still further to 52 and this last figure remains constant if *alkyl aryl p phenylenediamines* is substituted.

Partial coding is frequently associated with the indexing of names: this, as will be shown subsequently, is a pointless restriction. Nevertheless, names will be examined first and the techniques of partial coding will be illustrated by reference to a single name: 'Smith'. Many edge-punched cards have an alphabet printed along one edge and it is possible to code a name by selecting the first three letters and notching out the corresponding letters on the edge: Smith might be coded as S+M+I. In feature cards it is usual to employ three alphabets, or other sets of characters; one being for each letter, or other character, position. Wherever suitable the individual sets will be indicated by subscripts, e.g. $S_1+M_2+I_3$.

Bourne[1] has shown that not only the first three letters may be coded. The last three may be used instead (Smith = I+T+H). Vowels could be omitted as they have less defining power. Redundant letters, e.g. the u after q, or duplicate letters could be removed from the coding system. Other letters could be dropped on an arbitrary basis until a code of some desired length was obtained: for example, every second letter could be removed; in this way Smith might become S+I+H. Numerals can be substituted for letters. This dubious practice can be traced back to 1878, when the American librarians J. Schwartz[8] and C. A. Cutter[9] attempted to bamboozle their readers with complex coding. At that time librarians appear to have been obsessed with allocating unique cyphers to books in their care, and there were constant complaints about the brevity of Dewey's notation! Schwartz's scheme combined classification by size (duodecimo, octavo, quarto and folio) with an arithmetic code corresponding to the author's name. Thus a tome from an author Kirk would have been coded 245, 647, 849 or 949 depending upon size: the approximate similarity of the numbers may be noted. This was not enough for Cutter who extended the concept by adopting an expansive notation. When the number of books sharing one number became too large, the numbers were simply expanded: thus, Gor-Guk might start out as 32, but could eventually become Gor-Got 320; Gou-Gral 321 and so on *ad infinitum*. Presumably gold leaf was dearer than labour, whilst assistants were illiterate but not innumerate in Victorian times.

Another, and probably more profitable, approach to partial coding is afforded by the study of letter frequencies. Bourne[1] has published a number of tables on this topic. These may be augmented by reference to Brillouin[10] where the probability of occurrence is also listed. Papier and Lin[11] have compared the frequency of initial letters in four technical thesauri.

When the question of coding authors' names arose at NRPRA, reference was made to Ohlman's work[12] on the frequency of initial letters in proper names. It was found that his data were based on an analysis of the telephone directories for Syracuse, New York, and it was feared that American names might have little bearing on British, or other, frequencies.[13] As a first step Ohlman was compared with the London telephone directories and when some variance was found the survey was extended to other British telephone directories, the *Library Association Yearbook* and indexes to *Chemical Abstracts* and *RAPRA Abstracts*. A Malaysian directory was also consulted as a considerable number of South East Asian names occur in documents at NRPRA. Some of the data are assembled in the accompanying table (Table 1). The regional variance throughout the United

Kingdom is very noticeable. In London, B is the most frequent initial letter and occupies approximately 9.9 per cent of the directory. In South-West Wales, J occupies 8.9 per cent of the directory as compared with 2.1 per cent in London.

DIRECTORIES

	London	Birmingham	Manchester	Leeds	Newcastle	Norwich	S.W. England	S.W. Wales	Edinburgh	West of Scotland	N. Ireland	*LA Yearbook*	*Chemical Abs*	Malaysia
A	4.0	3.5	3.7	3.5	4.0	7.8	2.7	2.5	3.9	6.7	4.2	3.1	4.1	6.5
B	9.9	12.0	10.9	10.4	8.9	9.6	8.9	5.4	8.7	7.7	8.8	10.5	8.1	5.5
C	8.3	7.5	8.1	7.1	8.0	9.2	8.9	5.4	7.6	9.0	9.9	7.4	5.2	9.4
D	4.4	4.2	4.4	4.4	4.7	3.7	4.7	7.9	4.7	4.9	4.8	4.8	4.4	2.9
E	2.5	2.7	2.2	1.9	2.1	3.2	2.3	5.9	2.4	1.0	1.7	2.3	2.0	2.3
F	3.5	3.0	3.3	3.3	3.3	3.2	2.7	2.0	3.9	3.1	2.8	3.1	3.6	2.6
G	4.8	4.6	4.6	4.4	4.5	4.6	3.9	5.0	4.6	4.9	5.4	5.1	5.3	3.6
H	7.2	8.7	9.4	8.7	7.5	7.3	8.1	5.9	6.3	6.4	6.8	9.1	5.2	4.2
I	0.8	0.6	0.6	0.8	0.7	0.5	0.4	0.5	0.7	0.8	1.1	0.6	1.6	1.3
J	2.1	2.9	2.6	2.2	2.3	1.8	2.7	8.9	1.5	1.8	1.7	2.8	1.6	1.9
K	2.6	2.0	2.2	1.9	1.6	1.8	2.3	1.0	2.0	2.6	2.8	2.3	7.9	4.5
L	4.9	2.6	5.1	5.7	4.2	4.1	3.9	5.4	4.1	4.3	4.1	4.3	4.3	7.5
MAC	3.6	0.7	1.5	1.1	1.9	1.4	1.6	0.5	6.3	10.3	11.6	2.3	0.8	0.3
M	4.2	6.2	6.7	5.4	5.6	5.0	5.4	5.9	6.8	6.4	7.9	6.0	7.2	7.1
N	2.3	2.0	2.7	2.5	5.1	3.2	1.6	2.0	2.0	2.1	2.3	1.1	2.9	3.2
O	1.3	1.3	1.6	1.4	1.2	0.9	1.6	1.0	0.9	0.8	1.7	1.4	1.9	1.9
P	5.4	6.1	4.9	4.9	4.9	5.0	7.8	6.4	5.9	3.3	3.4	5.7	5.1	4.2
Q	0.2	0.1	0.1	0.3	0.2	0.5	0.4	0.5	0.2	4.3	0.3	0.3	0.1	1.0
R	4.9	5.1	5.0	4.6	5.9	4.6	5.4	5.4	5.7	5.1	4.0	4.6	4.3	3.6
S	9.1	8.9	9.5	9.5	9.4	8.7	9.7	6.4	10.2	8.5	7.4	9.1	11.2	10.1
T	3.8	4.5	4.3	4.9	5.4	5.0	5.8	5.9	3.7	3.3	3.4	3.7	4.0	6.6
U	0.7	0.7	0.4	0.3	0.5	0.5	0.4	0.5	0.4	0.3	0.8	0.3	0.9	1.0
V	0.9	0.7	0.6	0.5	0.7	0.5	1.6	0.5	0.8	0.3	0.3	0.6	2.2	1.3
W	6.3	8.8	4.8	9.5	6.6	7.3	7.0	8.4	6.3	5.6	2.3	8.3	3.4	3.9
XYZ	0.5	0.6	0.5	0.8	0.7	0.5	0.4	0.5	0.8	0.8	0.3	0.6	2.9	3.2

TABLE I

The first eleven columns relate to data obtained from British telephone directories; the twelfth column covers the *Library Association Yearbook*; the thirteenth relates to a *Chemical Abstracts* index (the variance between these and Ohlman's data[12] should be noted as a time effect must be taken into consideration); and the fourteenth column was based on *The Straits Times Directory of Malaya & Singapore*. The figures express the percentage frequencies of each letter within the directories.

3.5 per cent of Londoners are Mcs or Macs: in Edinburgh this grows to 6.3 per cent, whilst in the West of Scotland and Northern Ireland the figures soar to 10.2 per cent and 11.6 per cent respectively. Certain letters appear very rarely, notably I, Q, U, V and XYZ.

Eventually the following were selected as the initial 'letters' for the NRPRA system:
A, Ba-Bl, Bm-Bz, Ca-Cl, Cm-Cz, D, E/F, G, Ha-Ho, Hp-J, K, L, Mc (including Mac), M (excluding Mc/Mac), NXYZ, OQ, P, R, Sa-Sl, Sm-Sz, T, U/V, W. In the second letter position the vowels, rather than the consonants, are divided, e.g. Oa-Oh, Oi-Op, Or-Oz. The alphabetical order is slightly disturbed again, e.g. N/P/Q, but this does not seem to hinder the punching operation seriously. In the third set, Z is joined by a 'blank' to cater for two-letter Oriental names, like Ho: coded as Ha-Ho$_1$+Or-Oz$_2$+Z/blank$_3$. If a 'blank' is not provided, searches for names like Ho would produce all combinations beginning Ho; Horridge for instance. Before leaving names, it is worth noting that rules are needed for coping with odd forms, like prefixed and hyphenated names. The former and the first element of the latter should be ignored. Detailed advice is available in the *Anglo-American Cataloguing Rules*,[14] although it is doubtful if many co-ordinate indexers have to handle such complexities as heraldic visitations, popes who later become saints, and university observatories at a distance from the campus.

Partial coding may be adapted to cope with numerals in place of numbers, or with numeral/letter combinations. If the symbols are used in a decimal manner then the undermentioned progression will result, where x indicates the number of digits available:

Number of unique codes:	x	x^2	x^3	x^4 . . . .
Number of sets of digits:	x	$2x$	$3x$	$4x$ . . . .

The number of things capable of being coded in this manner is almost infinite and the examples are merely quoted to illustrate the technique. Dates could be coded with four numeral sets: 1970 could be expressed as $1_M+9_C+7_D+0_A$, where the subscripts imply millennium, century, decade and *anno*. Steam locomotives were classified by the number of leading, driving and trailing wheels in a system known as the Whyte notation. Thus a Pacific locomotive was also known as a 4-6-2, codeable as $4_L+6_D+2_T$. It should be noted that this series jumps in steps of two. If a locomotive lacked leading or trailing wheels, this information should be coded: thus a 4-6-0 could be $4_L+6_D+0_T$. Failure to note the zero would effectively cause the 4-6-2 and 4-6-0 locomotives to share the same code. Car registration numbers, postal codes and telephone numbers could all be expressed as partial codes.

The notation from classification schemes can be converted to partial coding, quite simply. 663.4 is the Dewey notation for beer: this could be expressed as $6(10^2)+6(10)+3(1)+4(1^{-1})$. UVP is the Bliss[15] notation for the paper industry: this could be coded as $U_1+V_2+P_3$. The use of notation in this way offers some theoretical advantages to the operator of specialized thesauri. A vast amount of detail is available in general classifications which could be used as an ancillary feature instead of extending the specialized thesaurus. This could limit the effort involved in thesaurus construction. The notations are normally generic in character and this feature would be carried over into the partial coding; further, hierarchical searching in the post-co-ordinate phase would be far simpler than in the traditional linear catalogue. Even Ranganathan's notation[16] could be handled simply (Δ spiritual experience: β mathematical science) as the symbols only need to be written once. Unfortunately, the worst features of most existing classification systems would also be transferred to the post-co-ordinate system. Thus Dewey classified railways in four different places (385, 621.3, 625 and 656): these distributed relatives would cause minor chaos in a changed environment. Most of the general classifications are hopelessly out of date and rarely revised, but work on a new general thesaurus may change this.[17] Specialized classifications could also be considered: obvious examples would be *Thesaurofacet*[18] and the Board of Trade's Standard Industrial Classification.

The use of longitude and latitude, together with the more specialized National Grid References, for coding geographical locations have been described recently.[19] This concept can be extended to more general situations by laying a transparent matrix over any diagram (see Figure 1). Each diagram would need a thesaural term, but the components would not require labelling, being identifiable in terms of distance from the x and y axes. The distance could be indicated by one or more sets of x and y numerals: in its simplest form a component can be identified by a code such as $x2+y6$. A rule would be required to indicate which part of the component was to be taken as the read-off point: this might be either the points nearest, or furthest, from zero and the diagrams would need a reference mark for resuperimposing the grid. Diagrams could show detail on a larger scale or matrices of more than one scale could be employed to cope with detail. This technique affords a means of coding non-linguistic information, such as any point on the block diagram (see Figure 1).

Finally, partial coding can be extended into a semi-semantic environment. Thus, calcium carbonate could be coded in the following ways:

(i) calcium compounds + carbonates
(ii) *or* $Ca+CO_3$
(iii) *or* $Ca+C+O_3$
(iv) *or* $Ca+C+O$

The facility for noise increases downwards. Thus a search for ozone at stage (iii) would not be made easier by the presence of carbonates in this fractured form. The degree of fracturing possible would depend upon the characteristics of individual systems: $Ca+C+O$ might be quite adequate for a relatively 'non-chemical' environment. This technique is highly developed in UKCIS search profiles and appears to work quite satisfactorily, although some of the noise may be highly novel: the term *THIA* (intended to produce sulphur derivatives) retrieved references to the Carpathians (the asterisks indicate that the term may be culled from the centre of a term). Further, a computer environment offers great flexibility as terms may be lengthened or shortened almost at will: thus a term like *BUTADIENE* can be cropped still further to produce references on all dienes.

So far as can be detected, only one system has attempted to use partial coding as the basic coding technique in a feature card system: this was the Alpha-Matrex machine developed by Miller.[20] The complexities involving tape-typewriters, automatic card selectors and powered drilling can be ignored in this context leaving the coding technique to receive attention. The features consisted of seven alphabets. Terms (Uniterms were used) were modified to meet the seven letter length. If they were too long, they were cropped to fit; if they were too short, the elements were repeated until a seven letter code emerged: air became AIRAIRA. Miller claimed that no noise was evident in test runs, but the fuller treatment promised in a later volume of *Studies in Co-ordinate Indexing* failed to materialize.

With the exception of the system described immediately above, subcoding appears to have been restricted to ancillary functions in feature card systems. This is at variance with the policy sometimes adopted for edge-punched, 80-column and other cards with restricted coding fields, where subcodes formed the basic coding technique. This distinction has to be emphasized because edge-punched cards, etc. are part of the concept of post-co-ordinate indexing.[2,21] Subcoding must be considered as beneficial, no matter what its limitations in terms of complexity and noise, in the environment of limited coding fields. The associated question of the desirability of using devices which limit the coding

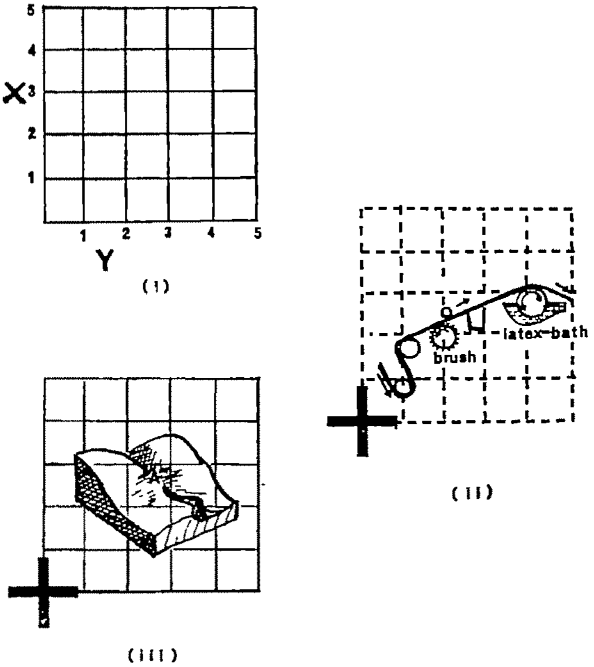

FIG. 1: *The matrix* (i) *may be constructed of any transparent material, but should preferably be polymethyl methacrylate sheet* (*Perspex*) *and can be overlaid on any diagram marked with a reference point* (*bottom left* (ii) *and* (iii)). *If parts of the diagram are interpreted by their proximity to co-ordinates then the rotary brush in the carpet backing machine* (ii) *would be coded as* X2+Y2, *and the point* A *on the block diagram would be* X2+Y3.

field will be ignored and the remaining discussion will centre upon the suitability of subcodes for feature card systems.

All subcodes share certain features. They offer a means of greatly reducing the number of feature cards to be purchased and stored. On the other hand the amount of punching or drilling will increase, although this may not apply in certain generic partial coding systems where generic posting is in effect built into the code. In graphic coding the use of trigraphs will triple the amount of punching, filing and other operations at the imput stage and will make punching errors three times as likely. The greater complexity at the searching stage is less significant. If input is greatly restricted, or if the coding field is greatly extended (which will in itself tend to invalidate the technique), the method is relatively precise. As input is increased noise will grow, although this may not be a problem where the device is restricted to an ancillary level: in fact, in Cranfield terminology, subcodes are probably precision devices in many situations (e.g. the coding of author names).

In addition each of the main techniques offers some distinct characteristics. Graphic coding, especially if coupled with randomization, offers a means for optimizing the number of postings on feature cards, which is presumably a theoretical advantage. Codes consisting of random elements have very little mnemonic value and a separate index has to be maintained to link terms with codes. This index has to be checked every time that an item is coded and before a retrieval operation may start. Mis-filing may cause identical terms to have different codes and it is extremely difficult to rectify these errors. Similarly, terms may later be found to be synonymous: for instance, trade names frequently change. Lastly, it is almost impossible to link graphic codes to each other generically.

At least some of the above criteria do not apply to partial codes. They are often highly mnemonic and an auxiliary index may not be required. Many are inherently generic and at least some of them are capable of handling non-linguistic information. On the other hand, optimum posting can no longer be achieved (even in theory), systems are less predictable, more feature cards may be required (resulting in even more punching errors) and codes are still difficult to change. Nevertheless, in certain situations (like geographical location and names) partial coding may offer an alternative to direct coding.

Standard feature cards can be used instead. The extra cost involved is small in relation to the total involved in operating a system. The manufacturers might be persuaded to produce simplified cards (probably without matrices) at reduced cost to cope with infrequently used or subsidiary terms. It would also be possible to use Uniterm terminal digit cards for these functions. The work involved in maintaining this type of index would be no greater than that involved in graphic coding and conversion to normal feature card working, if required, would be simple. If a term to code index is maintained on cards (as at NRPRA), the space occupied by the Uniterm cards would be identical. In conclusion, partial coding may have a place in feature card systems, but graphic coding should be restricted to systems with limited coding fields. Uniterm cards might be considered as an alternative in feature card systems.

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DO SUBCODES HAVE A PLACE IN CO-ORDINATE INDEXING?

A. G. A. PICKFORD, M. HAINES *and* P. F. KENDALL

In the previous paper, presented at a meeting of the Co-ordinate Indexing Group on 19th November 1970, K. P. Jones (NRPRA) had concluded that subcodes were likely to be a hindrance rather than a help in a co-ordinate indexing system. At a meeting of the Group held on 14th December 1970, discussion and experience were invited on this topic. The following are contributions submitted to the meeting.

1. A. G. A. PICKFORD, *Project FAIR, National Institute for Medical Research*

Subcoding for *IRBEL (Indexed References to Biomedical Engineering Literature)*

On the whole I agree with Mr Jones's reasoning and conclusions against subcodes. In Project FAIR, however, we have been forced to use a subcode as part of the subject index of our publication *Indexed References to Biomedical Engineering Literature* (*IRBEL* for short). A brief account of our experience with this trigraph code might contribute to this discussion.

IRBEL is published at about four-monthly intervals and is taken by approximately 250 biomedical engineers, who are doctors, engineers, consultants and professors working in hospitals, universities and institutes throughout the world. Each issue consists of a booklet containing 640 references and an author index, and is accompanied by a pack of feature cards which is the subject index to the references. Each pack of feature cards is the index to either 640 or 1280 references. In the case of the latter, two fields of 640 are superimposed—one field being round holes and the other oblong. Each pack contains between 275 and 350 cards, each headed with a descriptor. Twenty-six of these cards are headed with the twenty-six letters of the alphabet and are punched with the trigraph codes of between 300 and 600 additional, infrequently used, specific descriptors. Some more details about these twenty-six 'trigraph' cards may be of interest.

The trigraph cards are fairly heavily punched. Over 150 of the 1280 locations are punched on each of the twenty-six cards, which is roughly the same heaviness of punching that occurs on the most popular main term cards. The punching is engineered to be evenly and randomly spread over all the trigraph cards, mainly by using combinations of three letters chosen at random from the combination Trigraph Layout Triangles, as supplied by J. L. Jolley and Partners Ltd.

Code ABC happens to represent the metal LEAD in our system, and by superimposing cards A, B and C and then looking up the appropriate accession numbers in the appropriate booklet, one would find that not all papers had been indexed with the descriptor 'lead'—which brings us to false drops. Sample tests have shown the false drops to be anything between 20 per cent and 80 per cent until the three trigraph cards are co-ordinated with a main term, when the percentage then drops to a level which, in practical terms, is trivial. Common sense suggests that where several trigraph codes have been assigned to one paper, the percentage of false drops is likely to be higher, and in these circumstances we find it worth choosing the codes a little less randomly so as to avoid overlap of letters in the codes, although this will not be possible with terms which have been allocated codes previously. On the whole, the trigraph section works well, especially when the cards are used in combination with main term cards, but a code is a considerable barrier to users, who often settle for a more generalized search statement than they need. On the other hand, since project FAIR is in the business of mass producing sets of feature cards, it would clearly be bad economics to produce lots of cards with very few holes in them, so we feel compelled to compromise by using the trigraph device. After each issue of *IRBEL*, a promotion/demotion exercise is carried out whereby frequently used trigraph terms are made into main terms and vice versa. Our main criteria of judgement of which descriptors to transfer are frequency of occurrence and our knowledge of the changes taking place in the discipline of biomedical engineering.

Finally, the reasons we chose a trigraph using twenty-six letters of the alphabet are that (i) it is a well trodden path, and (ii) unique combinations of three out of twenty-six letters number 2600, which copes adequately with our 300 to 600 trigraph terms in each issue, but does not result in cards so heavily punched that our Reproducing Punches could not cope.

To summarize, we feel that our commitment to mass-producing sets of feature cards, and our wish to provide an adequate number of specific keywords in the subject index, justify our use of a trigraph subcode in spite of the discouragement it gives to some users. We hope they will overcome their dislike of the code in time, since the system is designed to be an integral part of their own personal information retrieval system and they can be expected to get used to it.

2. M. HAINES, *Gas Council*

Subcoding for co-ordinate indexing gas appliances

As part of the vast conversion operation in the UK, the Gas Council listed all known domestic catering and commercial appliances likely to be encountered in the course of conversion. The list covers about 12,000 appliances produced over the past forty years.

The work at Watson House can involve any of these appliances and there is a need to index an individual appliance in our co-ordinate index of technical and scientific information.

Fortunately each of the appliances in the Gas Council Appliance Code Index already has a unique seven digit numerical code so it remained only to allocate a sufficient number of feature cards to accommodate the codes.

The first digit in the code indicates the main range of appliances, e.g. 1—Cooking appliances; 4—Central-heating boilers, Warm-air systems. There are nine groups, or ranges, altogether.

The second digit in the code indicates the type of appliance within the range, e.g. 11—Domestic cookers with integral ignition; 12—Domestic cookers without integral ignition; 41—Central-heating boilers.

The third, fourth and fifth digits in combination indicate the name of the manufacturer, e.g. 593 POTTERTON; 476 MAIN, R. & A.

Any manufacturer with a large number of appliances will have more than one set of three digits but each set will be uniquely associated with his name.

The sixth and seventh digits in combination indicate the specific model. Two examples of particular appliances are:

11 476 48 Main Whiterose Two 149 cooker
41 593 18 Potterton RS 42/50 SB Central-heating boiler.

Our co-ordinate indexing system is a Termatrex with colour/number tabs on each feature card. We have allocated cards Yellow 31 to Yellow 99 for indexing the appliances on the Gas Council list. These are used as follows:

For the first digit, which may be 1 to 9, cards Yellow (Ye) 31 to Ye39 are used.

For the second digit, which also may be 1 to 9, cards Ye41 to Ye49 are used.

The third to seventh digits can each be in the range 0 to 9, and cards Ye50–Ye59 (for the third digit); Ye60–Ye69 (fourth); Ye70–Ye79 (fifth); Ye80 Ye89 (sixth); and Ye90–Ye99 (seventh), are used.

Taking the examples of two particular appliances already quoted:

For the cooker
(11 476 48): cards Ye31
Ye41
Ye54
Ye67 } are all drilled
Ye76
Ye84
Ye98

For the central-heating
boiler (41 593 18): cards Ye34
Ye41
Ye55
Ye69 } are all drilled
Ye73
Ye81
Ye98

With the seven figure code the maximum number of appliances which could be covered is $9 \times 9 \times 10^5 = 8.1$ million; and suitable combinations of $9+9+(5 \times 10) = 68$ cards can cover all these to provide a unique identification.

It can be seen that as the first and second digits singly, and the third to fifth in combination, have significance with regard to the type of appliance (first and second digits) or the makers (third, fourth and fifth digits), less than seven cards suitably chosen can indicate groups of appliances. For example, the holes on Ye31 indicate all cookers; Ye31+Ye41 in combination indicate all domestic cookers with integral ignition; Ye55+Ye69+Ye73 indicate many Potterton appliances. As already mentioned some manufacturers have more than one combination of three numbers. In order, therefore, to locate all their appliances, more than one combination of three cards from Ye50–59, Ye60–69, and Ye70–79 will have to be superimposed.

The sixth and seventh digits have no significance out of context of a complete set of seven cards.

The permission of the Gas Council to publish this short paper is gratefully acknowledged.

3. P. F. KENDALL, *BP Chemicals International Limited*

Subcoding for indexing press cuttings

We have been using two varieties of subcodes for indexing press cuttings since 1st July 1970. We employ about 300 cards with a capacity of 10,000 items and to 16th November 1970 we have indexed 524 items.

To subcode companies we have three alphabetical sets of cards to represent the initial, penultimate and final letters of the company name (or common abbreviation). This easily leads to false drops, e.g. in searching for Hercules (H E S) an article about Hooker (*H E* R) and US Steel (U S *S*) is obtained. For Hercules we have six false drops out of nine drops, although practical examples in which searches are made by more than one feature (e.g. company, country and chemical) seldom give false drops. From our experience so far, including the amount of punching involved, we will probably stop using this type of subcode in our next pack of cards.

For chemicals we use separate feature cards for frequently occurring chemicals, but for the rest we employ a specialized subcode comprising functional group, carbon number and functionality (e.g. mono-functional, poly-functional, elemental, etc.). Because of the low incidence of articles in which subcoded chemicals are indexed this has been successful.

LIBRARY AND INFORMATION SCIENCE ABSTRACTS: THE FIRST TWO YEARS

ALAN GILCHRIST *and* ALEXANDRA PRESANIS

Aslib Research Department

WITH the thirteenth issue affected by the recent postal strike, now seems an opportune moment to take a look at the performance of *LISA* in its first two years. This bi-monthly abstracts service succeeded the former *Library Science Abstracts* in 1969 as a joint venture between the Library Association and Aslib. An account of its birth[1] and a brief report on early progress[2] both appeared in 1969.

During the first year a total of 2,567 abstracts were published of which 2,125 (83 per cent) were of journal articles and the remaining 442 (17 per cent) were of monographic material—mainly conference proceedings and reports, with a few books. In the second year the total had risen to 2,858 and the number of journal articles, 2,411 (84 per cent), showed the same proportion as in 1969. A more detailed analysis has been made of the abstracts of journal articles for the two years. In 1969 the 2,125 abstracts were based on 239 titles from which the numbers of articles abstracted ranged from 1 to 92, which approximates to the well-known Bradford–Zipf distribution. Over half the abstracts (1,140 or 53.7 per cent) are of articles in only 33 (13.8 per cent) of the journals, which titles supply at least 22 abstracts each. All 33, not surprisingly, specialize in librarianship or information science, as do a further 156 titles. The residue of 50 fringe journals specializing in subjects other than librarianship or information science provide 89 (4.2 per cent) abstracts. In 1969 the journals abstracted came from 39 different countries, over half being British or American in origin. Nearly half the journals are published in Western Europe, but Eastern European journals, though few in number, accounted for over one-fifth of the total number of abstracts. Table 1 shows the geographical distribution of origin of journals and articles for 1969 and 1970.

About 60 per cent of the papers abstracted were written in English, the remainder being in over 20 other languages of which German and Russian were the most prominent. Table 2 shows the language distribution for 1969 and 1970. The other languages included Danish, Italian, Norwegian, Spanish, Bulgarian, Afrikaans, Flemish, Hebrew, Chinese, Croatian, Portuguese, Slovene and Slovak.

It is interesting to compare the coverage of *LISA* with the other two major abstracting services in librarianship and information science, the American *Information Science Abstracts* and the relevant section of the Russian *Referativnyi Zhurnal* (English translation). The three services are of comparable size; they do not aim to cover exactly the same subject area, but even so they have a surprisingly small overlap. The figures for 1969 are as follows:

	*No. of abstracts**	*No. of journals*
LISA	2567	239
Referativnyi Zhurnal	2973	309
Information Science Abstracts	2638	247

* Includes both journal and monographic material

	1969		1970	
	No. of journals	*No. of articles*	*No. of journals*	*No. of articles*
TOTAL	239 (100%)	2125 (100%)	255 (100%)	2411 (100%)
W. Europe—UK	66 (27.6%)	425 (20.0%)	80 (31.4%)	472 (19.6%)
remainder	48 (20.1%)	447 (21.1%)	56 (21.9%)	416 (17.2%)
N. America—USA	57 (23.9%)	527 (24.8%)	56 (21.9%)	704 (29.2%)
remainder	10 (4.2%)	58 (2.7%)	8 (3.1%)	52 (2.2%)
E. Europe—USSR	5 (2.1%)	133 (6.3%)	6 (2.4%)	152 (6.3%)
remainder	23 (9.6%)	331 (15.5%)	19 (7.5%)	312 (12.9%)
Asia	21 (8.8%)	133 (6.3%)	17 (6.7%)	175 (7.3%)
Australia + New Zealand	2 (0.8%)	39 (1.8%)	6 (2.4%)	66 (2.7%)
Africa	7 (2.9%)	32 (1.5%)	7 (2.7%)	62 (2.6%)

TABLE 1: *Geographical distribution of origin of journals and articles, 1969 and 1970*

1969		1970	
Language	*No. of articles*	*Language*	*No. of articles*
TOTAL	2125 (100%)	TOTAL	2411 (100%)
English	1255 (59.1%)	English	1531 (63.5%)
German	217 (10.2%)	German	209 (8.7%)
Russian	134 (6.3%)	Russian	151 (6.3%)
French	67 (3.1%)	French	96 (4.0%)
Czech	64 (3.0%)	Czech	71 (2.9%)
Dutch	62 (2.9%)	Japanese	60 (2.5%)
Polish	46 (2.2%)	Polish	59 (2.4%)
Swedish	44 (2.1%)	Dutch	53 (2.2%)
Hungarian	44 (2.1%)	Rumanian	37 (1.5%)
Rumanian	37 (1.7%)	Finnish	26 (1.1%)
Other	155 (7.3%)	Other	118 (4.9%)

TABLE 2: *Language distribution for 1969 and 1970*

Only 51 journal titles were found to be abstracted by all three services as can be seen in Figure 1.

Figure 1 suggests that an exhaustive coverage can still be obtained only by using the three services and that the British and American services are somewhat closer. It is also reasonable to infer that the 51 titles give a good guide to what are the core journals of librarianship and information science and these are listed alphabetically in Table 3 together with their countries of origin.

It will be recalled that 33 titles accounted for 53.7 per cent of the abstracts of journal articles appearing in *Library and Information Science Abstracts,* and the asterisks in Table 3 show 22 titles which are common to the lists of 33 numerically productive titles for *LISA*, and the 51 titles abstracted by all three services. The 33-list contains four titles which surprisingly do not appear in Table 3 and which should perhaps be added to this somewhat subjective list of core journals: *Bulletin of the Medical Library Association* (USA), *International Library Review* (USA), *Journal of Education in Librarianship* (USA) and *Library Resources and Technical Services* (USA).

The delay between the availability of the original paper, and the availability of the abstract is of interest and this has been examined for a sample of 16 titles all drawn from the list of 51 titles abstracted by the three services. The sample, which for convenience are all titles held in the Aslib library, cover core and fringe journals in librarianship and information science, the major languages and publishing countries and a selection of the minor ones. The delay between availability of the original paper and availability of the abstract has been taken as the difference between the dates of receipt of each in the Aslib library, so that the figures in Table 4 are of immediate interest only to readers in the UK. Readers in the USA and USSR will however be able to derive some idea of their own situations by adding or subtracting estimated delivery times to particular titles. The figures in Table 4 are based on 332 papers from the 16 titles which were published in *LISA* in 1969. The indexes of *Referativnyi Zhurnal* and *Information Science Abstracts* were searched for 1968, 1969 and those issues of 1970 which were available. *Referativnyi Zhurnal* abstracted 182 of the 332 papers in the issues up to that received at Aslib in June 1970 and none in any later issues. *Information Science Abstracts* published only 115 of the papers in the issues available up to the end of 1970—the latest being number 2 of the 1970 volume.

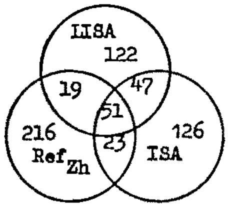

FIGURE 1: *Overlap of journal title coverage between* Library and Information Science Abstracts (LISA), Information Science Abstracts (ISA) *and* Referativnyi Zhurnal (Ref Zh)

The target time for *Library and Information Science Abstracts* is three months and this has very nearly been achieved, the mean delay being 99 days compared with 165 days for *Referativnyi Zhurnal* and 427 days for *Information Science Abstracts.*

Library and Information Science Abstracts has been well received and well reviewed in the journals, many of which have remarked on its good coverage,

Aktualne Problemy Informacji i Dokumentacji	Poland
*_A(merican) L(ibrary) A(ssociation) Bulletin_	USA
*_American Documentation_	USA
Annals of Library Science and Documentation	India
*_Aslib Proceedings_	UK
*_Australian Library Journal_	Australia
*_Bibliotekar' (Moscow)_	USSR
Biblioteki SSSR	USSR
*_Bibliothekar_	E. Germany
Biblos	Japan
*_Bulletin des Bibliothèques de France_	France
Canadian Library Journal	Canada
*_College and Research Libraries_	USA
Communications of the A(ssociation for) C(omputing) M(achinery)	USA
Datamation	USA
D(okumentation) F(achbibliothek) W(erksbucherei)	W. Germany
DK-Mitteilungen	W. Germany
Institution of Electrical and Electronic Engineers Transactions—Engineering Writing and Speech	USA
Indexer	UK
Indian Librarian	India
Information Scientist	UK
Information Storage and Retrieval	UK
Journal of the A(ssociation for) C(omputing) M(achinery)	USA
*_Journal of Chemical Documentation_	USA
*_Journal of Documentation_	UK
Journal of Librarianship	UK
Knihovník	Czechoslovakia
*_Library Association Record_	UK
*_Library Journal_	USA
*_Library Quarterly_	USA
Library Trends	USA
*_Library World_	UK
Libri	USA
Methods of Information in Medicine	W. Germany
*_Nachrichten für Dokumentation_	W. Germany
Nature	UK
*_Nauchno-Tekhnicheskaya Informatsiya—Series 1 and 2_	USSR
N(ational) M(icrofilm) A(ssociation) Journal	USA
Probleme de Informare şi Documentare	Rumania
*_Program_	UK
Publishers' Weekly	UK
Scientific Information Notes	USA
*_Special Libraries_	USA
Studii şi Cercetări de Documentare	Rumania
Technická Knihovna	Czechoslovakia
Tidskrift för Dokumentation	Sweden
*_Tudományos és Müszaki Tájékoztatás_	Hungary
*_Unesco Bulletin for Libraries_	France (International)
*_Wilson Library Bulletin_	USA
Zeitschrift für Bibliothekswesen und Bibliographie	W. Germany
*_Zentralblatt für Bibliothekswesen_	E. Germany

TABLE 3. _51 core journals abstracted by all three services_

	No. of abstracts			Mean delay			Max. delay			Min. Delay		
	LISA	*Ref Zh*	*ISA*	*LISA*	*Ref Zh*	*ISA*	*LISA*	*Ref Zh*	*ISA*	*LISA*	*Ref Zh*	*ISA*
ALL 16 JOURNALS	332	182	115	99	165	427	170	274	722	48	85	197
Akt. Probl. Inf. Dokum.	20	20	10	123	132	508	162	165	662	49	99	439
Am. Docum (now *JASIS*)	35	30	23	128	193	358	170	267	420	92	148	197
Ann. Libr. Sci. Docum.	9	4	3	88	115	642	120	115	642	68	115	642
Bibliotekar'	27	—	—	106	—	—	133	—	—	72	—	—
Bull. Biblioth. Fr.	24	14	—	109	167	—	141	243	—	81	111	—
Can. Libr.	16	3	—	93	194	—	154	194	—	85	193	—
J. Docum.	26	12	7	79	172	342	109	210	359	55	147	330
J. Librarianship	16	7	2	72	151	497	98	194	497	51	112	497
Libr. Trends	12	—	12	102	—	387	112	—	461	74	—	298
Nachr. Dokum.	41	35	33	97	152	442	109	202	637	82	107	324
Nature	4	4	2	82	180	361	104	211	410	64	159	312
NMAJ (now *J. Micrographics*)	11	10	4	75	232	362	88	274	372	65	166	351
Sci. Inf. Notes	4	—	—	115	—	—	133	—	—	78	—	—
Tidsk. Dokum.	12	6	2	118	196	618	128	242	722	111	113	514
Unesco Bull. Libr.	43	26	13	84	142	428	123	209	522	48	85	397
Zentbl. Biblioth.	32	11	4	101	152	562	133	235	681	70	121	521

TABLE 4: *Delay times of the three services*

speed of notification and cheapness (though the price has had to be increased this year). Reviews and subscriber feedback are particularly useful and a number of improvements have been introduced as a result. Perhaps the most controversial factor is the use of the Classification Research Group's *Classification of Library Science* which some users consider to be too complex (an interesting reaction from a user population largely composed of librarians and information scientists). A special sub-committee was set up representing the Library Association and Aslib and this carefully considered the conflicting demands of current awareness and retrospective search capability. The view taken was that *LISA* also had an 'historical' function and that the advantages of a detailed and specific scheme would become increasingly apparent as the cumulated body of material grew larger. Consequently, various recommendations were made for the improvement of the typography and layout in order to make *LISA* more acceptable as a current awareness tool, and a major recommendation was for the citation order to be changed, promoting 'technique' to a more prominent position and before 'type of library'. The CRG Classification is itself being extensively revised at the North-Western Polytechnic School of Librarianship, which is also the home of a research project investigating the concept of an intermediate lexicon experimentally in the subject field of librarianship and information science.[3] A later article could profitably look at indexing in *LISA* in the light of these two developments.

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Letter to the Editor

Dear Sir,

RANK XEROX LTD

In *Aslib Proceedings,* vol.22, no.7, you published a letter from me referring to the wastage rate of 'xerox' copies. 'Xerox' is of course a trade mark of Rank Xerox Ltd, and was wrongly used by me to cover the whole range of dry electrostatic copies. Mr Griffin's comments (vol.22, no.9) are quite correct. My apologies are due to him and to Rank Xerox Ltd.

Yours faithfully,
P. G. PEACOCK
Deputy Librarian

University of Stirling,
Stirling.
31st March 1971

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

Items are available in the Aslib library and may be borrowed unless marked to indicate reference copies*

User Studies

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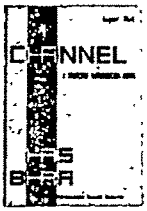

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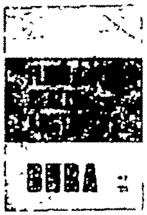

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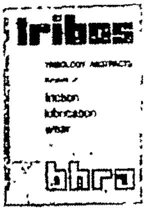

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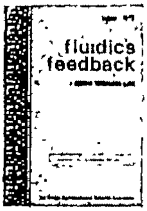

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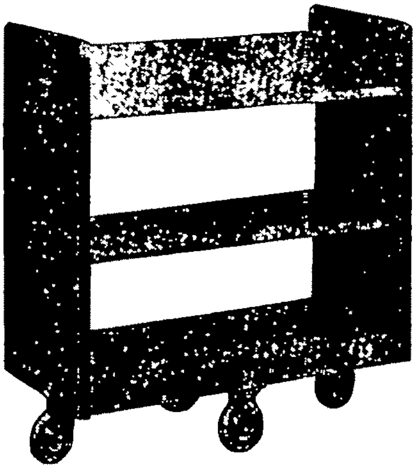

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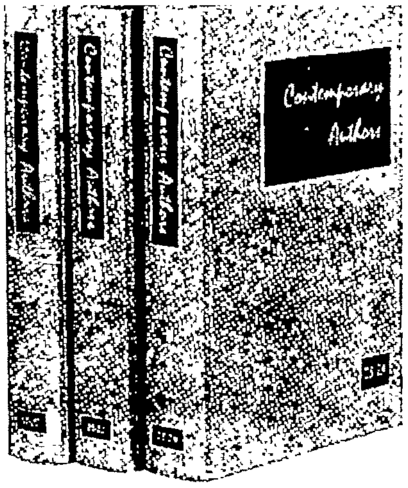

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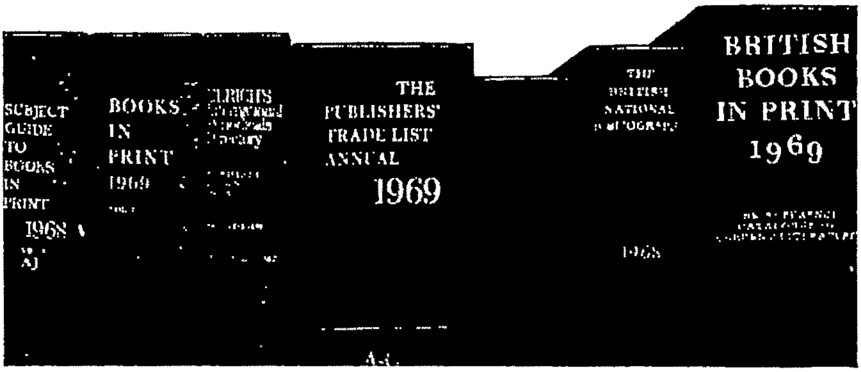
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Volume 23 June 1971 Number 6

ASLIB CALENDAR 1971

July

FRI.9–SUN.11.	Electronics Group 13th Annual Conference. Churchill College, Cambridge.
TUE.13.	Engineering Group visit to CEGB Marchwood Engineering Laboratories, Marchwood, Southampton.
FRI.23–SUN.25.	Aeronautical Group Annual Conference. Cranfield Institute of Technology.

October

SUN.10–THU.14.	Aslib 45th Annual Conference. Darmstadt, W. Germany.
WED.20.	Aslib Evening Meeting. 'Ergonomics and libraries', by J. G. Fox (University of Birmingham). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1. 5 for 5.30 p.m.

November

THU.18.	One-day Seminar: Computers and the librarian. Connaught Rooms, Great Queen Street, WC2.
WED.24.	Aslib Evening Meeting. 'Administering diffuse collections', by W. Ashworth (Polytechnic of Central London). Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1. 5 for 5.30 p.m.

Aslib 45th Annual Conference

The advance programme of Aslib's 45th Annual Conference, to be held in Darmstadt, West Germany, from 10th to 14th October, has been widely distributed: to Aslib members with the March issue of *Aslib Proceedings* and to workers in the library, information and documentation fields in Europe and overseas. *If, owing to the disruption of the postal services, you have not received your copy of the programme, please contact the Conference Organizer, Aslib, 3 Belgrave Square, London SW1, immediately.* The air charter arrangements, for members travelling from the United Kingdom, make early application particularly advisable this year.

The city of Darmstadt has many attractions, professional and otherwise, for the conference goer; and with its museums, art galleries, programmes of music and of drama at the Landestheater, it is a centre of culture both old and new. Delegates will be offered a wide choice of visits: the German Plastics Research Institute, the German Centre for Numerical and Non-numerical Computer Applications, the Post Office Telecommunications Centre, ESOC, the Hesse State and University Library and Firma Merck in Darmstadt; the Deutsche Bibliothek and University Library, the Institut für Dokumentationswesen and German Centre for Mechanisation in Documentation, DECHEMA and Farbwerke Hoechst in Frankfurt; Badische Anilin- und Sodafabrik and Brown Bovery and Cie in Mannheim-Ludwigshafen; the German Centre for Cancer Research in Heidelberg; the German Meteorological Centre in Offenbach. Not far away are the historic city of Heidelberg and the beautiful valley of the Rheingau, famous for its wines. Visits have been arranged to both of these.

Among the distinguished speakers will be Dr Martin Cremer, Director of the Institut für Dokumentationswesen and Wilfred Ashworth, Chief Librarian of the Polytechnic of Central London; Brian Edwards of Standard Telecommunications Laboratories and Professor Robert Jungk of the Berlin Centre for Futures Research; N. E. C. Isotta, Head of Service, ESRO, and C. Pelzer, Director of the Division of Scientific and Technical Information, International Atomic Energy Agency in Vienna; Donald Bishop, Director of Management Services, Department of the Environment; Lindsay Corbett, UKAEA; and Professor D. J. de Solla Price of Yale University.

Aslib's hosts in Frankfurt and Darmstadt are both generous and indefatigable and should conspire to make this a conference of quite exceptional interest and value.

Next President of Aslib

Sir Alan Wilson, FRS, Chairman of Glaxo Group Ltd, has accepted the Council's invitation to serve as President of Aslib for 1971–2. He succeeds Sir John Wolfenden whose term of office expired at the Annual General Meeting of Aslib held on 9th June, 1971.

A new Vice-President

Mr R. H. Matthys, Deputy Chairman of Courtaulds Ltd, has agreed to serve as Vice-President of Aslib for 1971–4. He succeeds Vice-Admiral Sir Frank Mason whose term of office expired in June 1971.

Director of Aslib a JP

Members will wish to congratulate Mr Leslie Wilson, Director of Aslib, on his appointment as Justice of the Peace for the Middlesex area of Greater London.

Printing indexes by computer

Aslib Research Department is currently carrying out a comprehensive survey of computer systems which are primarily intended for the compilation and printing of indexes. The report on this project, when published, will include a detailed review of the literature, and will also indicate the availability of appropriate software, where this can be ascertained. A subsequent phase will be to produce specimen indexes, using a limited selection of these systems, to compare operational characteristics and costs.

From a literary survey it has been established that a great variety of systems exist, and that some of these are available for general use. In certain cases, individuals who were known to have developed computer systems for printing indexes have been contacted to obtain information on the general availability of their software. Several computer manufacturers have also been approached for information relating to software of this kind.

In a broad survey such as this, however, it is difficult to ensure that all relevant and important computer systems have in fact been covered. It would be greatly appreciated if readers of *Aslib Proceedings* could provide details of any computer systems for index production which have not been reported in the literature. Comments and suggestions on the scope of the project would also be welcomed. Information should be sent to P. H. Vickers, Research Department, Aslib.

Aslib Transport and Planning Group

At the Annual General Meeting of the Transport Group held on 5th April, it was decided to widen the scope of the Group so as to cover urban and rural planning. The newly elected committee were asked to consider in detail the implications of the Group's widened interests, and to determine what its new title should be. At its first meeting, the committee decided the title should be 'Aslib Transport and Planning Group'.

The new committee members are: Chairman—Miss A. M. C. Kahn (Department of the Environment); Vice-Chairman—D. Kennington (GLC, Department of Planning and Transportation); Hon. Secretary—G. J. Broadis (Royal Institute of British Architects); Hon. Treasurer—Mrs J. F. O. Southgate (Chartered Institute of Transport); A. Doyle (Department of Trade and Industry); Miss I. E. Harvey (British Railways Board); Miss K. Henderson (London Borough of Lambeth, Libraries Department); G. Ottley (Leicester University Library). Co-opted members: R. L. McLennan (Town Planning Institute); C. Parker (Southampton University Library); F. H. Smith (British Transport Staff College); Mrs B. White (University of Edinburgh).

The Hon. Secretary will be pleased to hear from any librarians and information officers in the planning field who would be interested in joining the Group. His address is: RIBA, 66 Portland Place, London W1N 4AD.

UK MARC Project

The British National Bibliography has received a one year grant of £41,759 from the Office of Scientific and Technical Information for development work associated with its MARC service. Since the beginning of 1971 the British National Bibliography has been computer produced and the major cost associated with the production of the tapes now forms part of BNB production costs. Ancillary activities, chiefly those associated with the maintenance of the Library of Congress data bank, the addition of Library of Congress subject data to British records, and the distribution of an experimental tape service, are supported by the grant.

To ensure adequate liaison with MARC users and other institutions, a small Project Advisory Committee has been set up under the Chairmanship of Mr E. H. C. Driver, Librarian of Aston University and Head of the Birmingham Libraries Co-operative Mechanization Programme. The other members of the Committee are: Mr F. Ayres, Deputy Librarian, Bradford University; Mr H. East, Research Department, Aslib; and representatives from BNB and OSTI.

Both the Research Department and the Education Department at Aslib are also co-operating with the BNB over the use of the MARC services. The Research Department is carrying out a survey of potential users of the MARC tapes, in order to establish whether their coverage and content require any improvement; while the Education Department, in order to assist those libraries who are considering using the MARC services, has prepared a course jointly with the BNB, entitled 'An introduction to MARC'. The first course was presented on 10th–11th June at Aslib headquarters, and it will be repeated as often as demand warrants. Anybody interested in these courses should contact the Education Officer at Aslib.

Redundancies of Industrial Librarians

The newly formed Industrial Group of the Library Association has announced that it intends to enquire into problems surrounding conditions of service in the industrial library sector, including redundancy of industrial librarians and cutting back of libraries and information units. The Industrial Group has appealed to all librarians who have experienced redundancy or who have been involved in curtailment of services during the last year or so, to write in confidence to the Group. Reasons for redundancy, difficulties or otherwise of finding alternative employment, and any other relevant details, are requested.

The Chairman of the Group, to whom replies should be addressed, is: Mr. B. S. Nuttall, BPB Industries (Research & Development) Ltd, East Leake, Loughborough, Leics.

On-line information retrieval at Culham

Since 1966 the Culham Laboratory of the UK Atomic Energy Authority has operated a computer-based service providing selective dissemination of information (SDI) in the field of plasma physics; and in 1967 OSTI gave partial support for the evaluation of this service. In 1968 the laboratory began to experiment with on-line retrieval techniques using part of the growing plasma physics data base, and recently the work has included retrieval from small data bases in computational physics and the social sciences.

OSTI has now awarded to the Culham Laboratory a grant of £15,200 over two years in partial support of an investigation of on-line techniques using the INSPEC data base as well as those listed above. In particular the project will test the rapid on-line retrieval of information in a 'real-life' situation in which practising scientists formulate the searches that they require for their current work. The system will be offered to selected university scientists as well as to a selection of scientists at Culham.

It is hoped that study of this 'real-life' situation will provide practical guidelines for the design of on-line information systems in other subject fields.

Storage and retrieval of biological information

The Linnean Society in conjunction with the Committee on Biological Information (of which Aslib is a member) held a course of lectures in Autumn 1970 on the storage and retrieval of biological information. These lectures are being reprinted in the September 1971 issue of the Society's *Biological Journal*, and will include lists of libraries, abstracts and indexes, data and information retrieval services in pure and applied biology, and culture collections. As there will be a limited number of extra copies printed, requests for copies (at £2.50 each) should be sent as soon as possible to: The Editorial Secretary, Linnean Society of London, Burlington House, Piccadilly, London W1V 0LQ.

FID Conference and Congress

The 36th FID Conference and International Congress will take place from 1st to 13th September 1972 in Budapest. The open Congress will discuss the theme: 'Participation of less industrialized countries in world-wide documentation activities and information exchange'. Anyone interested in submitting a paper on this topic is requested to do so by 1st September 1971. Any suggestions for specific subjects to be discussed at the three sessions arranged would also be appreciated by the Organizing Committee. For further information contact: FID General Secretariat, Hofweg 7, The Hague, Netherlands.

New materials handling information service

The National Materials Handling Centre was established recently with the support of the Department of Trade and Industry, to provide an advisory, information and research service to industry. Aspects of the service to members include: the bi-monthly *International Handling Review*, which includes a wide selection of abstracts of world-wide literature; a copy of the monthly IPC technical journal *Mechanical Handling*, incorporating the Centre's newsletter; information inquiry service; loan and photocopying service; and purchase of NMHC reports at preferential rates.

Membership rates are from £10 to £250, depending on the number of employees in the company making the application. Further details on the Centre may be obtained from the Director, National Materials Handling Centre, Cranfield Institute of Technology, Cranfield, Beds.

Rock mechanics information service

The report of the OSTI-supported project on the development and evaluation of a specialized information service for rock mechanics, carried out at Imperial College, London, is now available from the National Lending Library as OSTI Report No. 5076. The service at present includes a quarterly journal, a Keyword-in-Context (KWIC) index covering the years 1870–1968 and available in book or tape form, SDI and retrospective searches. The report on the project, by Mrs A. Gralewska, describes and analyses in detail the problems, procedures and decisions involved in designing and setting up a system of this kind. Of particular interest are details of the use of a faceted classification in computer-search strategies and the inclusion of a comprehensive economic evaluation.

Aquatic Sciences and Fisheries Abstracts

Information Retrieval Limited have formed an agreement with the Food and Agricultural Organisation of the United Nations, Rome; the Institut fur Dokumentationswesen, Frankfurt; the Bundesforschungsanstalt für Fischerei, Hamburg; and INRA, Station d'Hydrobiologie, Biarritz, to establish a computerized documentation system in the field of Aquatic Sciences and Fisheries. Each partner will scan sections of world wide literature to locate relevant articles immediately they are published and will forward details to a co-ordinating centre at the FAO in Rome. 3,000 scientific journals will be covered, and it is anticipated that over 15,000 articles will be collected each year. IRL will prepare a detailed précis of each article and will publish them monthly in *Aquatic Sciences and Fisheries Abstracts* which begins publication in July 1971. This journal will amalgamate *Aquatic Biology Abstracts* currently published by IRL and *The Current Bibliography for Aquatic Sciences and Fisheries* currently compiled by the FAO.

Also taking part in the project is Zentralstelle für Maschinelli Dokumentation of Frankfurt who will develop a completely mechanized system for storage and retrieval of this information, which it is planned will become operational in 1973.

The publishers comment that this is one of the first occasions in the field of the dissemination of scientific information upon which an international group from the public and private sectors have come together to pool their resources. Further information is obtainable from A. G. Woolcott or T. R. Ottey at Information Retrieval Ltd, 38 Chancery Lane, London WC2A 1EL. (01-435 1305.)

Line Printer at the IEE

Now that the Documentation Processing Centre has been closed down, OSTI has transferred the Data Products Corporation's line printer to the Institution of Electrical Engineers in London for experimental work on INSPEC. It is OSTI's intention that the line printer should continue to be used, by approved applicants, for experimental work mainly in connection with OSTI-supported projects. The range of applications, it is envisaged, will include the production of library catalogue cards, the display of chemical structures, and the production of high-quality output from current and retrospective information services. OSTI has awarded a grant of £16,050 to the IEE in order to meet the cost of experimental work related to OSTI-supported projects.

On-line serials control system at UCLA

The University of California Biomedical Library, with the support of a National Library of Medicine grant, is developing an on-line serials control system. The system is designed to support four central functions of serials processing: reference, check-in, claims, and bindery. The data base is the Library's file of over 12,000 serial titles, 6,500 of which are currently received by the Biomedical Library.

Serial arrivals are checked in at a CRT screen. A well trained clerk or student assistant will check in thirty to sixty journals per hour. The title of the piece (or more often, only a portion of the title) is keyed in on the terminal keyboard. In response, all relevant information for the check-in process is displayed on the screen by the computer. Since the system is programmed always to anticipate the next expected issue, the most frequent operator response after scanning the screen is the code 'OK', and the journal becomes checked in. Several other codes provide for arrival of back-issues, 'skipped' issues, etc.

Reference displays (or off-line print-outs) may be obtained by subject, language, or country of publication. These displays or lists may have complete holdings and history notes upon request. By using a combination of terms, a very specific selection of the file can be obtained in a few moments by operating a terminal.

Evaluation of the system is expected to be completed toward the end of this year, at which time a detailed report will be prepared for publication. Any further information on the system will gladly be supplied by: Harvey Hammond, Assistant Biomedical Librarian, Biomedical Library, The Centre for the Health Sciences, Los Angeles, California 90024.

Research in information science

OSTI has funds available in 1971/72 for five research studentships, tenable for up to three years, and one research fellowship, tenable for up to two years, in information science. Science Research Council (SRC) standards and procedures will be applied; full details can be found in *SRC Studentships and Fellowships 1970*, which is obtainable free from SRC or OSTI or is available for consultation in universities.

Royal Society grants for study in Europe

The Royal Society is prepared to consider applications from those working in information science for Fellowships and Study Visits available under its European Programme. This programme, introduced in January 1967, is intended to further relations between research scientists in the university laboratories and other scientific institutions of western Europe. Substantial financial support was received from several donors to initiate the scheme, and in addition the Royal Society administers a grant from the Department of Education and Science for long- and short-term visits to and from western Europe, where matching funds by other European countries are set aside for the scheme.

Further details and application forms are available from the Executive Secretary, The Royal Society, 6 Carlton House Terrace, London SW1.

Selective trade literature for the construction industry

Following a survey of information needs among building and civil engineering trades and professions from September to December 1970, a new catalogue distribution service for suppliers to the construction industry was recently introduced by Bellard Information Services. Called the Construction Industry Register, the service uses computer techniques to enable suppliers of trade and technical literature by post to select only those companies who want to receive it.

The large response from the 20–25,000 firms and practices which took part in the survey was evidence of the dissatisfaction in the industry with the wastefulness of conventional direct mail methods. The new service is designed to eliminate this wastefulness by holding the information needs—contributed by construction and design firms on a questionnaire—in a computer data bank, which will then be used to select names and addresses most appropriate to suppliers' individual mailing plans. The questionnaire on which Bellard's retrieval system is based is linked to CI/SfB, the standard library classification of the industry. This makes it possible to match CI/SfB coded literature with a similarly classified readership.

For further information about the Register and details of costs, etc., contact: Bellard Information Services Ltd, 1 John Adam Street, Adelphi, London WC1.

Controlled circulation journals—the German view

Readers interested in the paper published in this issue on controlled circulation journals, which was presented at an Aslib evening meeting on 21st April 1971, may also be interested to learn of a German article on the same subject, published in a recent issue of *Dokumentation, Fachbibliotek, Werksbucherei.* Details are as follows:

SAMULSKI, P. Das Novum Kennziffer-Zeitschrift. Ein Werbemedium mit Zukunft, betrachtet aus der Arbeit der Technischen Informationsbibliothek Hannover. *DFW*, 18, 6, Sept./Oct. 1970, p. 196–210.

The article also contains a list of controlled circulation journals published in the Federal Republic of Germany. A copy of the article is available from the Aslib Library.

CICRIS—20th anniversary reception

On Wednesday, 28th April, CICRIS (Co-operative and Industrial Commercial Reference and Information Service) held its 20th anniversary reception at Ealing Town Hall. Within CICRIS there are the library services of eight boroughs (Barnet, Brent, Ealing, Hammersmith, Harrow, Hillingdon, Hounslow and Richmond upon Thames), fourteen college and university libraries, and more than ninety industrial libraries.

The reception was attended by over eighty members and included representatives from other regional schemes of library co-operation. A message of congratulation from Lord Eccles, Minister for the Arts, was read to the assembled guests, and telegrams of congratulation were received from Aslib, the Library Association, Sir Basil Blackwell, and Richard S. Gothard & Co. Ltd.

Secretary General of FID

The Council of the International Federation for Documentation (FID) is currently inviting applications for the post of Secretary General of FID, which became vacant on the resignation of Dr F. A. Sviridov. The final selection of the new Secretary General will be made by the Council at its meeting in Paris at the end of September. The successful applicant will be expected to start his duties at the beginning of October 1971.

Applicants should preferably have the support of their respective National Members (Aslib in the UK). The post carries an initial salary of between 45,000 and 55,000 Dutch guilders.

Applications, with curriculum vitae, should be submitted by Monday, 16th August 1971, to: FID General Secretariat, Hofweg 7, The Hague, Netherlands.

W. Australian Institute of Technology—Dept. of Library Studies

The Western Australian Institute of Technology set up a Department of Library Studies in 1970 and seventy students are currently pursuing the first undergraduate course. A particularly interesting feature of this course is that it allows students to study subjects closely related to the work of the librarian, such as sociology, statistics, systems analysis, etc., but which are not normally included in the more traditional courses in library studies. The Institute's courses will also pay particular attention to promoting international understanding and interest in library activity, including consideration of the problems of developing countries.

As readers may have seen in the advertisement section of the May issue, the Department is currently inviting applications for three posts: Senior Lecturer in Retrieval Processes; Lecturer in Bibliographical Resources; and Lecturer in Library Management and Operations. Anyone requiring further information about these posts is invited to write to the Head of the Department, John Dean, at the Western Australian Institute of Technology, Hayman Road, South Bentley, WA 6102.

People and places

MISS GILLIAN CLEGG, recently appointed Librarian to the advertising trade paper, *Campaign*, has been awarded the Sir Evelyn Wrench Travelling Fellowship for Librarians by the English-Speaking Union. Miss Clegg will be well known to a number of Aslib members as the former Librarian of the advertising agency, J. Walter Thompson. She intends to use the Fellowship for a month's study of US libraries in the fields of advertising, marketing and publishing. She leaves for the USA on 17th September 1971.

BRIEF REVIEWS

AMERICAN REFERENCE BOOKS ANNUAL. 2 volumes. Edited by Bohdan S. Wynar. Littleton (Colorado): Libraries Unlimited Inc., 1970. 205 pp; 210 pp. $19.75 *set.* (SBN 87287 013 8; 87287 014 6).

This is the first issue of an annual which reviews reference books, published in, or with major distributors in, the United States during one year; some important reprints are also included. The 1970 edition covers 1969 publications and a full bibliographic description of each book is given.

Each book is given a review, but these vary from one line to a full page. Some seem unnecessarily long, such as that for *Books in Print*, while others are not detailed enough. If the review is from a published source, the source is shown. The publishers say that in the second edition each review will be signed and a list included of all the contributors and the professional positions they hold.

The publication is issued in two slim volumes: volume one covers general reference, social sciences, history, economics and business; volume two covers fine arts, humanities, science, and engineering. These major subject sections are further subdivided. The two volumes are sold as a set but each is independent, having separate pagination and an author and title index to the contents of only that volume.

The second edition covering mainly 1970 publications was due for publication in America in April 1971. According to the publishers it will include bibliographical survey articles on library literature and area studies, and a number of retrospective bibliographical guides to particular subject fields, in addition to reviews.

AMERICAN SOCIETY FOR TESTING MATERIALS. Coden for periodical titles (including non-periodical titles and deleted coden): an aid to the storage and retrieval of information and to communication involving journal references. Prepared and maintained for the ASTM by the Science Information Services, Franklin Institute Research Laboratories. Edited by J. G. Blumenthal and Marta Karaman. Philadelphia, Pa.: the Society, 1970. 2 volumes. 2045 pp. $215. (ASTM Data Series DS23B).

This set of coden covers over 109,000 titles of periodicals from the physical and biological sciences, including medicine and psychology and economics as it affects the sciences. Each title is assigned a five-character code designating the title of a specific serial publication. The first four characters are used mnemonically and the fifth is either A or B to increase the number of combinations possible.

The listing is in two Volumes: vol. 1, Periodical titles arranged by Coden; and Vol. 2, Periodical titles arranged alphabetically by title. Each volume is in two parts, periodical titles and non-periodical titles, the latter being described as 'serials' or any item generally appearing at regularly stated intervals. Both old and current titles are included with cross-references where necessary and there are no restrictions on the language of publications, but all titles are transliterated into the Roman alphabet.

CO-OPERATIVE INDUSTRIAL & COMMERCIAL REFERENCE AND INFORMATION SERVICE (CICRIS). Union list of interlingual dictionaries. Select list of foreign language dictionaries held by CICRIS members. 2nd edition. London: CICRIS, 1971. 91 pp. £1.25. (SBN 902941 00 3).

This list, compiled by the staff of the London Borough of Ealing Reference Libraries, refers only to dictionaries which include a foreign language, unlike its earlier edition (CICRIS *Union List of Technical and Translating Dictionaries*, 1959), and is intended to be a full listing of the holdings of CICRIS member libraries. Arrangement is by language and within language by author. At the end of each language section there is a list of dictionaries in the 'Polyglot' section containing that language.

There is a subject index (the list is not confined to scientific and technical subjects), and additional information includes source and target language, subjects covered (after every foreign language title) and the English title where this appears in the dictionary. Holders of the titles are indicated by number only, which must then be checked in the (separate) CICRIS *Directory*.

Although they do not claim absolute accuracy of entry, owing to pressure of time and in some cases conflicting reports from members, this is a useful reference work for the location of dictionaries in the West London area.

WILKES, IAN. British initials and abbreviations. 3rd edition. London: Leonard Hill, 1971. 346 pp. £5.50. (ISBN 0 249 44073 3).

The second edition of this publication appeared five years ago. This new edition has been considerably enlarged in size because of the increase in the number of entries and the adoption of an expanded format. The publication lists organizations in the United Kingdom and the Republic of Ireland, as well as international organizations of which Britain is a member at any level, that are known by a recognized abbreviation

Arrangement is alphabetical by abbreviation with entries including not only the full name but also the address and telephone number of each organization. The subject index lists just abbreviations under broad subject headings; these headings are essentially the same as in the second edition.

CONTROLLED CIRCULATION JOURNALS

R. J. FINDLAY *and* W. STREATFEILD

Morgan-Grampian (Publishers) Ltd

Papers presented at an Aslib Evening Meeting, Wednesday, 21st April 1971

1. R. J. FINDLAY

Controlled circulation and the marketing environment

Company librarians and information officers are in the communications business. So are industrial publishers. We both try to serve approximately the same audience, but we rarely put our heads together to find ways of achieving our common objectives. If this meeting, therefore, does no more than lay the cables for a communications link which can be used to help us work more closely together from now on, it will have been a great success.

I shall talk about the marketing environment in which publishers operate, and why controlled circulation has become an increasingly important factor in our strategies. Bill Streatfeild, who is responsible for all the circulation activities of Morgan-Grampian (Publishers) Ltd, will describe the practical problems of administrating a system which despatches over a million publications every month.

Morgan-Grampian are publishers of twenty-three weekly and monthly journals, the majority concerned with engineering and process industries. Many of these are market leaders. The group also publishes various directories, organizes a number of exhibitions and is beginning to expand overseas.

Two years ago, half of our journals were subscription-based. Today most have controlled circulations, though some have both free and paid readers. All of our weeklies and big monthlies are essentially controlled circulation media.

The trend is obvious. It is also practically irreversible, for once a journal has gone 'controlled circulation' the task of getting substantial numbers of readers to begin paying for it again is formidable, particularly if other journals in the same field are available free of charge. Why are publishers hurtling down this path of no return? How can something of value be given away free?

We all know the answer: advertising. For it is a fact that, with very few exceptions, publishers' revenues derive essentially from advertisements. Subscriptions are seldom more than a small fraction of a large journal's total income. The profit lies in giving the advertiser what he wants.

Invariably, what the industrial advertiser wants is complete coverage of his potential market. He wants his advertisement to reach all those companies operating in industries where his products can be sold. And he wants his advertisement to be seen by the individuals within each company who are in a position to specify or purchase.

This means three things to the publisher. He knows that the cost of reaching the smallest companies will not be justified due to their low general purchasing power. But above whatever minimum size he decides is worthwhile within each industry group, he must aim to locate every known establishment and those individuals in it who influence buying. Moreover, he must collect data from them to demonstrate to his advertisers that he is delivering the optimum coverage of the market. Finally, he must provide evidence that these individuals are looking at his journal regularly.

The extent to which the industrial publisher can prove these criteria largely determines his journal's advertising revenue and, therefore, its profitability. The three criteria, then, are:

(1) The right establishments
(2) The right individuals
(3) Regular readership.

Herein lies the strength of controlled circulation. The advertiser will only expect to pay for those readers who can be proven to match his requirements. The reader is under no obligation whatsoever to supply such proof if he is paying for the journal; and indeed, can there be any reasonable grounds for the publisher to expect him to do so?

Our philosophy regarding controlled circulation is that the reader either may choose to pay money for his copy, in which case the charge reflects the full cost of producing same, or he may choose to supply information which will lead the advertiser to pay the cost of his copy, in which case he will be expected periodically to update this information by completing a registration form. These registration forms not only allow us to prove the first two points, they also, by implication, indicate the third—interest in reading the journal regularly. It is this last consideration which makes it necessary for the individual to complete and sign the form personally, since it is he personally whom we, on the advertiser's behalf, must choose to accept or reject as a qualifying reader.

This is the essence of Morgan-Grampian's current circulation thinking for industrial journals. It succeeds in any market where the advertising demand is large enough to support it.

If we apply our three objectives to some of the antiquated scepticisms so often heard about controlled circulation, we can soon expose them as the red herrings they really are.

Red herring number one goes: 'Readers are prepared to pay for what they want'. Now this seemingly straightforward statement is actually only a half-truth. What it should say is: 'Readers are prepared to pay for what they want if they cannot get it free'. There is quite a difference and the hard fact is that, in many fields, readers can now get what they want free of charge.

Old wives' tale number two: 'Journals given away free are of less value than journals which readers have to pay for'. This really is nonsense. The worth of a journal is a function of what it contains, not how you get a copy of it. And, other things being equal, the value of what it contains will be a function of how much it spends obtaining the information it publishes, which in turn depends very much on its revenue, which as we have already seen, depends on how much advertising it attracts, not on whether its readers pay a subscription charge. In any case, readers do not pay for journals in the industrial field. As long ago as 1965, a well publicized survey proved that 70 per cent of the industrial readers did not even know which of the journals they read were paid for and which were free. The company paid the subscription, not the individual. From the reader's point of view, what difference does it make whether the journal he reads was paid for by his company out of its subscription budget or out of its advertising budget? The fact that it remains in existence must indicate that it is being paid for, one way or the other.

Fable number three: 'Controlled circulation publishers flood the market with copies no one needs or wants'. All I can say to this one is 'Not for long'. I know that publishers tend to be a bit thick, but most of us at least know how much our print, paper and distribution invoices total each month. Most of us would very much like to reduce these costs and cutting out wasted copies is the fastest way to do so. Admittedly, there are problems here. Building a good circulation is difficult enough, but keeping it up to date represents a formidable cost problem. Because of this, up-dating tends to be done at fixed periods, every year, or every two years, except where recipients themselves undertake to advise us of address changes, status changes, etc.

It is accepted that at any point in time a small proportion of the distribution list may be in error. We should like to erase this error, but not if the cost of doing so is greater than the expense of letting it stand for a relatively short period. This is one of our greatest problem areas, but Bill Streatfeild will be exploring this in more detail in the next section. Of course, no one believes us when we say that this type of error is small and, dare I use the word, 'controlled'. It is a natural conclusion that if our circulation in your company is wrong then the entire distribution is likely to be equally out of date. This is one of the crosses publishers have to bear, though we freely admit that a large part of this is due to the slip-shod methods originally employed by controlled circulation publishers fifteen years ago. We are still trying to live down their legacy, although the culprits have in the main gone broke and disappeared. If there are any left, the coming year is likely to finish them off. 1971 will see a big acceleration in the trend towards merging or closing titles. Marginal publications are being squeezed as never before, with an increasingly sophisticated advertising market demanding greater statistical proof at one end and swingeing increases in the costs of paper, printing and postage, crippling publishers at the other end. Wasted copies are a luxury we can no longer afford.

The last of the great red herrings goes: 'Free-issue journals have sacrificed their editorial authority to their advertisers'. Nothing could be further from the truth. Advertisers do not just buy space, they buy exposure. If an editor sells his soul, his readers will find him out, and cease to read his journal. When that happens, advertisers will cease to advertise in it, and it will eventually die.

Let us go back to our three rules of profitable publishing. A perfect circulation campaign will get you into the right establishments, and to the right people, but it cannot make them open the journal. This depends on editorial content and packaging. Good editorial is as vital to the advertiser as to the reader, and the publisher has no problem of divided loyalties in this regard.

The advertisers' effect on editorial is an indirect one, in that the editorial profile is designed to suit a particular audience, and that audience is defined by the nature of the advertising we wish to attract. But this does not mean that inferior editorial is produced. On the contrary, it is a great asset for any editor to know precisely who his readers are so that he can tailor his product accordingly.

What makes good editorial? In recent years there has been a considerable change in the requirements of industrial readers, particularly amongst engineers. Ten years ago, the vogue for technical articles was to provide painstaking detail of how a new machine or process worked. The aim was to produce a word-photograph for the inquisitive mind of the engineering reader. Complex academic articles which taxed the reader's limits of technical knowledge were also thought to be of great interest, particularly if speckled with Greek symbols and elaborate drawings.

Today the engineer, ably assisted by your own efforts, has a large reservoir of reference information to call upon whenever he has a technical problem. It seems to me that his primary aim in reading industrial journals is not to make himself a walking memory-bank of every new development in his sphere of technology. Rather he relies on the technical press to bring perspective to new developments; to fit them into his existing technological framework. Instead of demanding a mere description of the development in technical terms, he seeks an expert interpretation of how it is likely to affect his activities. If the development is of immediate and direct relevance to his current activities, he will look elsewhere, often to you, for as much detail as exists on it. If it has no immediate application to his work, he is unlikely to want to spare the time to study it in detail.

The same is true of editorial packaging. It is no longer enough simply to present the facts and rely on the engineer's inate curiosity to carry him through a six-page article. We must tempt and encourage him to read and must entertain him while he is doing so, in much the same way as the consumer press. He is more likely to read a journal every week because he enjoys doing so than because he feels he ought to as part of his job. These fundamental changes in thinking on our part are leading to considerable modification of the style and content of many of Britain's most revered journals. Such things as shorter articles, brighter design and typography and flowing journalistic prose must be seen for what they are—a carefully planned reaction to current reader requirements in the face of intense competition for reading time, and not in any sense a lowering of traditional authority or editorial integrity. The fact that many of our major journals are now concentrating on interpreting technological development rather than merely describing it, may make them less useful to you as works of reference, though personally I don't see why. But what we must all recognize is that their primary function is not as reference books. If it were, they would not be viable because many advertisers would cease to support them regularly.

Less than ten years ago, £2,000 was considered a high salary for a technical editor. Today £4,000 is not uncommon on the more important journals. We are seeking not only technical qualifications but journalistic expertise, something we never worried too much about in the good old days. And we are prepared to pay for it.

Bill Streatfeild will now tell you in a bit more detail how our circulation department works; but I should first like to leave one thought with you. It seems to me that your interest lies primarily in providing reference material on demand for any or all executives in your companies. Our interest lies primarily in attracting regular, continuing readership of complete magazines amongst selected executives in your companies. To that extent we differ, but in all other regards we are playing the same game. I am sure there is room for closer teamwork.

2. W. STREATFEILD

Practical problems of controlled circulation

Bob Findlay has explained to you the philosophy of controlled circulation publishing, and how this affects the editorial, and the circulation pattern. I shall be discussing what this means in practical terms of reaching the right readers, what steps we have to take, the systems we use, and how we may be able to co-operate more closely. In this paper I shall be referring only to industrial journals, which is our main field of activity, and will, I believe, be your main interest.

The process starts with a brief—a journal profile—that is evolved after joint discussion between the publisher and marketing department. This sets out for us the terms of control, in terms of which people are to receive the journal, and in which industries. This can be spelt out in some detail, since in order to reach precisely the people we are after, hit-and-miss methods just will not do.

Let us take the people first. We are interested in people with real purchasing power, in the areas where our advertisers are trying to sell. We therefore have to ensure that they are in the correct management field, with corresponding job titles, job functions and purchasing power. We have to reach these people by name, as we have found from experience that only then does the journal achieve its greatest impact, and only then can we be sure that it is read at the time of issue, which we have found is not the case if they are circulated on long circulation lists. The advertisers lay heavy reliance on copies being personally addressed to recipients, and auditors examine our records annually to verify our claims in this regard. To satisfy the auditors that a copy is 'Personally Requested', we have to be able to show a card from the man requesting the journal, and this, by a new ruling, now has to be personally signed and dated by the reader himself.

Next, let us consider the question of finding the right establishments. We are interested only in reaching the range of establishments for which it is economic to publish, judged by whether they are in the appropriate field of business, and are large enough to have significant purchasing requirements.

Our guideline—for controlling by type of industry—is *Standard Industrial Classification* issued by the then Board of Trade (now the Department of Trade and Industry). An illustration might be helpful. We recently converted an engineering journal from subscription to controlled circulation, so as to reach all firms over given size limits in *Standard Industrial Classification* Board Divisions VI to XII, i.e. engaged in metal manufacture, mechanical engineering, instrument engineering, electrical engineering, shipbuilding and marine engineering, vehicles, and metal goods. These are further broken down into forty-six minimum list headings, e.g. in Instrument Engineering we have watches and clocks, surgical instruments and appliances, etc. Also to be accepted are a limited number of consultants, and certain people in machine shops in firms over a certain size, in industries outside this range.

Our journal profile specifies the number of firms to be reached on any given *SIC* classification. It may also specify by employee size brackets the number of firms to be reached in each *SIC*, and the number of copies allowed.

This then is the type of brief that we are set—how do we go about achieving it?

As far as the procedure goes, it is a large scale mailing and data vetting operation. Having selected the firms to be mailed—of which I will say more later—we send out reply paid cards, asking potential readers to sign these, to say that they wish to receive the journal, and to furnish us with sufficient specified details about themselves and their firms to enable us to decide whether they are eligible to receive free copies or not. These cards are all closely scrutinized, and coded, and if they pass all the criteria they go onto the journal mailing list, or onto a waiting list if no vacancies exist at that time.

It becomes obvious from the above that, with 365,000 readers on our books, we have a continuing large scale coding and definition problem on our hands. We must be able to analyse and control by the total of our readers' individual characteristics. We punch all these characteristics onto punched cards. They are all in coded form, and we have extensive ranges of codes covering all the job titles, geographic breakdowns (essential in order to save money by obtaining postal sorting rebates), job functions, etc., that we are likely to meet.

With regard to the coding of company size and *SIC* classifications, we have created a master list of industrial establishments, which saves us an immense amount of time on coding, as well as being more accurate, and providing us with our basic promotional tool and control.

At the outset I said that when we wanted to reach new readers, we selected the correct firms to approach; from our master list we can select very precisely the right establishments to mail. An added advantage is that it provides a cross check on the Department of Trade and Industry's figures of the number of firms available. In some areas we now believe that we are more up to date and accurate than the DTI's figures. The other great advantage of our master list approach to coding is a great saving in time—previously all company details were coded every time a man applied to read—and also a huge gain in accuracy.

It is a fact that no two people will code marginal *SIC* cases the same way. The important thing is to have a clear set of rules (we have had to extend the DTI's classifications in some cases in the interests of accuracy), and to have close control. Knowing that we only have to code each company once, we can afford to cross check the information if there is doubt (and where company size data is given by an individual there often is doubt!) and thus ensure that it is correct.

How can we judge the efficiency of our circulation?

Via the master list and the DTI's figures, we can see if our overall figures are correct. We can check the profile against our actual overall figures, and also by detailed statistics, for which we have developed computer programmes. The fact that readers apply for our journals is the main proof that they are happy with the situation. They have to reapply at one or two yearly intervals, depending on the nature of the journal. To these 'verification' operations, as we call them, we get a very high response rate indeed. The other yardsticks we have are the size of the enquiry response, and readership surveys, both of which can indicate the extent of readers' interest.

How can you help us?—And how can we help you?

One of our major problems in this area is the high rate of personnel movement. Unlike subscriptions, which are generally addressed to a firm, or department, we are reaching leading individuals, who by the nature of things, are often on the move, upwards or sideways. It is sometimes a while before a man leaving a firm or changing jobs tells us that he would like his copy posted to a new address. He usually has other things on his mind at the time of moving!

One way in which we could help you is by giving you a print-out of the people in your firm receiving our journals. If from this you could help us keep our lists up to date, say, scrutinizing an annual print-out, I am sure that we could both benefit.

When we have had cause to collaborate in this area with industrial librarians, they have always been unfailingly helpful. It would be nice if we could extend this mutual help.

DISCUSSION

MR W. T. EALES (British Timken) said that he was responsible within his organization for two departments, the library and the post room, where controlled circulation magazines created a problem. An example of the situation was that in one department of some forty personnel, fifteen copies of one journal were being received addressed to individual personnel. An example of the load on the post room, responsible for internal distribution, could be seen when twelve opened copies of one particular magazine were received in the library. On investigation it had been found that these had been received in the company and delivered to individual personnel who, on unwrapping, had passed them immediately to a department which had an obvious interest. The head of this department had then sent all the copies, through the internal post, to the library. A decision had now been taken whereby all magazines were held each morning in the mail room for inspection by the librarian and only those which were essential were passed out to addressees. He did not agree that the registration card was a successful method of ensuring that the journal got into the right hands. It was his experience in information work that there was a large group of people who delighted in collecting documents and journals of no value to them and, in particular, they would fill in any form or card to obtain free material. He was unhappy with the editorial material in the majority of controlled journals. He considered it to be of a low standard, there was a tremendous amount of duplication, and a lot of the information was out of date. He thanked Morgan-Grampian for their co-operation in the attempt at British Timken to stem the uncontrollable flow of journals into the company. They had been co-operative in despatching journals only to those personnel listed by the library, and in certain cases posting to home addresses. His battle was with other publishers who seemed unwilling to recognize that the information officer in industry could be of tremendous help in ensuring that these journals got into the hands of the right people.

MR FINDLAY said that with the increasing sophistication of the needs of the advertisers, the present situation at British Timken must be fairly uncommon. Publishers had to prove to advertisers that individuals had requested the copy they received, but beyond that they could not really comment. With regard to sending copies to any individual's home address, it was possible, but it was also a question of how many people read one copy. Pressure of rising costs on the publisher made him want to keep the print number down. He would, therefore, prefer to send one journal to a company for four people to read, rather than send four journals to four separate home addresses.

MR J. G. HALL (Esso) following on from the previous speaker emphasized a possible domestic problem if controlled circulation journals were despatched to home addresses. With reference to the effective current life of journals he suggested that a single copy displayed in the library could attract many more quick consultations than the practice of circulation or the provision of multiple copies. The latter practice also put an unduly heavy load on an organization's mail distribution system. Turning now to Mr Findlay's three conditions for the effective distribution of controlled circulation journals, he suggested that what was indicated as regular readership was really regular receipt, for, generally speaking, these journals were not read. Editorial content was thin and lacking in meat. He agreed that there had been a change in the reading habits of engineers in that they had switched over from controlled circulation journals to those which still provided substantial editorial material. He concluded by asking Mr Findlay if his organization was prepared on the receipt of written applications to make copies of its controlled circulation publications available to librarians and information departments.

MR FINDLAY's reply took the last point first, saying it was possible for a library to receive a controlled circulation journal if the library was willing to give written proof that the journal would be used in the advertisers' interest, e.g. if the journal was requested by the Chief Engineer, to be addressed via the library, then the library must promise to route it straight to him on arrival. With regard to the editorial quality of controlled circulation journals, this had nothing to do with distribution. It might be that some poor journals were controlled circulation, but there was no cause and effect. If the journal was not read, then the advertisements were not seen; if the advertisements were not seen, then there was no response to them, the advertiser would withdraw his advertisement from the journal, and quite quickly it would go out of existence. The journals with the biggest revenue were controlled circulation. Subscription journals had been dwarfed. Since being a controlled circulation journal, the *Engineer* had spent three times as much on its editorial, because it had got the money to spend. These points were fundamental.

THE DIRECTOR then asked Mr Findlay if he knew of any objective studies of editorial standards. MR FINDLAY said that no big survey had ever been carried out in the engineering field.

MR L. J. BIRKETT (BLMC) asked Mr Findlay about the balance of interpretative articles in, for example, the *Engineer* against product information. He considered there to be too much of the latter. MR FINDLAY replied that the *Engineer* was the only general weekly source of current information for engineers, and that they saw the role of the journal as keeping engineers up to date with what was happening in engineering and related fields, and in relating new developments in engineering to everyday practice. The *Engineer* limited its major articles to four pages as deliberate editorial policy, since any topic needing greater coverage would be covered in more specialist journals. The *Engineer* also had to cover news. New products were news and this took about 15 per cent of the editorial pages. This seemed a reasonable balance bearing in mind that new products were important to the reader.

MR BIRKETT went on to ask if Mr Findlay could give information on the methods of compiling the initial controlled circulation distribution list for the *Engineer* MR FINDLAY said that they had decided in advance who ought to be receiving the *Engineer* by controlled circulation, by taking the circulation records and compiling job titles and functions. Free copies were then sent to these people for six months asking the recipients to fill in a reader registration card. This worked all right for the small companies, but it was necessary to get a specialist company to telephone the large company to find out the name and status of the individual to whom the journal ought to be sent.

MR J. CAMERON (Engineering and Power Development Consultant) then asked Mr Findlay why it was that consultants had particular difficulties, in some cases, in getting copies of controlled circulation journals, since it was quite often a consultant who recommended materials, etc. MR FINDLAY replied that if a consultant could convince the circulation manager that he met the requirements of the advertisers, then there was no reason why he should not receive the journal.

In reply to a question from MR M. H. WATERFALL (Pressed Steel Fisher Ltd) MR FINDLAY said that all Morgan–Grampian journals were freely available and if an individual wanted a copy of a controlled circulation journal but did not meet the necessary requirements for a free copy, he could always buy it. The price in most cases would seem high, since subscription copies had to be self-liquidating and the individual would be expected to pay the full price of production of an individual copy; on most subscription journals advertising happened to subsidize the production of a journal, thus getting the price of a subscription below the 'real' level.

MISS A. FENDER (J. Lyons & Co. Ltd) asked how often was the controlled circulation department actually asked by the advertisers to see the actual circulation figures and the request cards; and also how was the screening done? Was it on a comparison of the print-out of each year's circulation list? MR FINDLAY replied that the advertisers would often ask to see a part of the circulation list and check, for example, whether his customers were represented (since they liked to try to catch the publisher out). It was a large job to keep continuous tabs on controlled circulation lists, but information was received from a large number of sources and cross-checks could be made.

MANAGING EFFECTIVELY: SOME TIPS FOR SPECIAL LIBRARIANS

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Paper presented after the Annual General Meeting of the Aslib Transport Group, 6th April 1970

THERE ARE many obvious dangers in attempting to pontificate in public on management. Not the least is that one is expected to practise what one preaches, especially if what one offers can be said to be, after all, only applied common sense! However, the fact remains that there is an urgent need for librarians to think about their problems—and how to solve them—systematically. Many of us are not in a position to arrange all our work for ourselves but we can always improve *any* situation to some extent. We may see some ways later in this paper. Actual results are hard to achieve, but it is certain that there is only one way to get them, and that is by effective management.

Remember that there is a difference between effectiveness (our aim) and efficiency (our means). Peter Drucker, the famous American management expert, has expounded this theme for many years in his excellent books, and I make no apology for quoting him often, though trying always to relate his general precepts to librarianship[1]—indeed I have been doing this for some time now through short courses on effective library management. These have been given to mixed audiences of librarians from all types of library, but today I am aware that you are, for the most part, special librarians, in some cases working alone or with only small staffs. This makes little difference to the general message; the principles are the same, and I am convinced that we in the special libraries, and perhaps particularly those working in industry, are very close to, and constantly aware of, management philosophies and management techniques of all kinds. Even in local and central government, such concepts as Planning Programme Budgeting (PPB) and Management by Objectives (MBO) are prevalent. The Greater London Council is certainly committed to these approaches, though one must admit that implementation of such philosophies within such a large organization has to be a slow and deliberate process.

On occasions many of us have probably wondered what motive was behind an invitation from our superior to visit him at a fixed time once a fortnight 'to have a chat'. At these meetings it was hard to perceive any actual reason, but on reflection, it becomes clear that this was a planned policy. He was appraising our work, setting us objectives, monitoring our progress—in other words—'managing' us, and using, or trying to use, techniques on us which at face value might be regarded as somewhat mysterious, but which upon further reflection, were eminently sane and practical. Why cannot these particular techniques be adopted at lower levels within the staff structure? Why don't we do it *ourselves*? After all, as soon as you get an assistant or junior you are in a managerial situation in which you find yourself delegating work, controlling activities, supervising and taking decisions.

Another basic fact at this stage—one you all know, but which is nevertheless important enough to bring into focus here—is that 'human resources' is the most important factor in the whole operation. Of course, management includes the utilization of all resources successfully, but a huge book fund, superb accommodation, etc. can never replace your human resources. These must therefore be organized and controlled in such a way as to get maximum effectiveness from them.

The equation is: People + Resources + Management = Results. I will venture, therefore, into some expansion and endorsement of Drucker's five principles for effective management. Essentially, these are habits of mind which need to be acquired, and I commend them to you. You can put them to the test. If it is any consolation Drucker believes that effectiveness can be learned, but it has to be 'worked at' continuously to get results. Many librarians need to remind themselves constantly of this.

1. Time

This is the first problem. You must find out where your time goes and consolidate your 'discretionary' time into useful units. You cannot manage other people's time unless you can control wastage of your own. You have to work to control your working day *systematically*. Time is unalterable and you cannot get more of it. It is a fixed factor. If you are in charge you can, for example, arrange to see your assistant regularly at set times and discourage interruptions, for if you are too easy-going in this respect you will find yourself taking away work to do on the train or at home.

The same principle can be applied upwards, with tact. Try to arrange with your boss when it is best for you to see him, making, if possible, a regular 'surgery' for discussion of problems and plans. I have done this recently and it really does work. Keep a diary to check on how you spend your time. Peter Drucker quotes a very good example of a company President who saw him every month for a period of 1½ hours. Drucker asked him 'Why 1½ hours, and not 1 or 2 hours?' The President's reply was that he had discovered that this period was the optimum time that he found he could give his attention. After 1 hour 20 minutes he would summarize the discussion and outline proposals. Needless to say no interruptions were allowed.

2. Contribution

Ask yourself the key question: 'What can I contribute?'. This, to me, is perhaps the most crucial question of all. Drucker puts it this way: when people are asked 'What do you do to justify your salary?', many will reply 'I run the sales force' or 'I have eight hundred people working under me'. These, he believes, are the answers given by people who focus downwards and inwards. Effective people always focus upwards and outwards. When this is applied to library work focusing inwards can mean, for example, having a good tidy catalogue or an efficient issue method, as if this in itself was enough. But this isn't really what we should be primarily concerned with as librarians. Should not a better answer (to the Drucker question) be: 'I see that all enquirers get the information they need, when they need it'. There is a lot to be said for the old cliché: 'The right book (or information) to the right person at the right time'. Effort must be geared to results, not to the means employed to get them. Start with the key question 'What results are expected of me?' rather than 'What jobs have I to do today?'. Techniques and tools are means, not ends.

Librarians and information officers, I am convinced, can contribute massively to the success of their organization by keeping foremost in mind what contribution they are making to it. Many of our fellow librarians and information officers unfortunately seem to lack the confidence to face up to this approach, and I have even seen librarians who have worked devotedly for years but who are all too easy to replace when the time comes for them to go. They have missed out on 'contribution'. Let Drucker summarize: 'To focus on contribution leads the manager to lift his eyes from the inside of efforts, work and relationships to the outside—to the *results* of the organisation.' In library terms, finding out what the user wants—not just once and for all but continuously—and how to provide him with it readily will lead the quicker to effectiveness in service.

3. Available strengths

Build on actual strengths, rather than attempting to do all things equally well. Where you have a weakness, let it lie fallow. Instead, pick fresh ground where you know you will find fertile development and develop this systematically. The impact you make is vital, and you can achieve this by using your own strengths and discovering and exploiting the strengths of your colleagues. Make each job a challenge, demanding attack and promising a victory. Talents vary and they must be variously employed. In this way only can you go from strength to strength and produce significant results. Many libraries do exactly the opposite. Unconsciously perhaps they pin their staff down, making jobs smaller and restricted rather than larger and expanding. Such a library can never be more than average in its effectiveness.

In my own experience, good staff can be stretched (i.e. encouraged to expand willingly) and developed (i.e. given more responsibility) well beyond the limits which individuals would set for themselves. This, of course, is intensely rewarding both for them and for the organization to which they are responsible. It is surprising how rarely such a policy is attempted by managers. Is this because they do not want to encourage subordinates to acquire and develop skills and thereby earn themselves credit? It takes courage to encourage your subordinates to shine, but surely this should be the manager's primary concern. A good manager will never worry about being outshone in a particular skill. Build upon your own strengths and those of your colleagues whether above, equal or below, matching them to the challenge of each situation. Do not attempt that which can only be done badly.

4. Performance

Concentrate on key areas where you know that good performance will produce outstanding results. Force yourself to stick to clear priorities. Do first things first and second things later, or possibly not at all. Otherwise you will get nowhere very quickly with nothing to show for your efforts.

5. Decisions

Take decisions which will be effective with a systematic approach. Librarians should not need to be reminded that such decisions need to be based on the fullest possible information, but do not wait for complete information; you will never get it and consequently you will make no decisions at all. Systematic decision taking will sometimes call for courage but a few soundly based and well thought out decisions are to be preferred to a succession of ill-conceived ones. Go for the right strategy rather than razzle-dazzle tactics.

That summarizes Drucker's five points for effective management. Perhaps your reaction may be that in theory this is all very well, but that it can have no relevance to your particular situation. Or you may decide that his is an ideal policy for top management, but of no earthly use to you, at your level. I would suggest with confidence that you would be wrong. In my own experience in managing libraries of varying sizes I have discovered that these principles do work. For this reason I commend them to you for your consideration.

Up to now I have been talking in general terms, but now I would like to mention actual cases of good management ideas in librarianship. We have in our profession today some very good library managers and it was my privilege to work for one in my younger days in a large county library. In another large county library an MBO programme is on trial—up to now with most promising results. In Leicestershire, advanced management ideas are already being successfully applied.

Nevertheless there is an urgent need for a much improved pattern of post-experience training for library managers and (as mentioned earlier) I have had some experience in the past year or two of organizing and directing short courses for senior librarians and information officers. The pattern of these courses has developed directly from industrial experience and, I think, does produce a successful, integrated and dynamic formula.

This formula is based on the simple premise that library managers need a framework around which to analyse their own problems. The need is, therefore, for a small team of course leaders to guide them constructively in this process. In my experience the ideal team consists of a management expert and a librarian (who acts as Director of Studies) with support on the final day from two other senior and experienced library managers to comment on the written projects produced. The course is highly participative, with intensive syndicate working in groups of six or seven leading up to the two thousand word project on Effective Library Management, which has to be completed on the final evening. This is typed and duplicated and provides the basis for final discussions with the two 'experts'. At all times in the course the general management principles introduced are related to library practices and, with care in selecting the syndicates, some good written results have been achieved under pressure. Obviously this type of course must be residential since working sessions go on to late at night and the 'togetherness' engendered plays a large part in breaking down reservations on the part of participants. The resulting frankness allows for a really honest examination of some of the critical issues brought out. In my view nothing but good comes of a good mixture of librarians from different libraries and, in a recent course, participants from the British Museum, government departments, industry, library schools, colleges and public libraries all found that much common ground exists in the management problems they face. As well as working together in syndicates they participated in practical interviewing sessions, ran meetings and finally were asked to 'commit' themselves to personal change at the end of the course. We hope this is a valuable commitment and such feedback as I have had certainly indicates that it is so.

In conclusion I would like to see all librarians and information officers asking themselves some of Drucker's questions:

—do I *manage* my time?
—do I really *contribute* to the organization?
—do I use fully my available strengths and those of my staff?

These are key questions in the development of effective library managers—how do you rate?

REFERENCE

1 DRUCKER, PETER F. *The effective executive*. London: Heinemann, 1967. (Paperback edition, Pan Books, 1970.)

AN ANNOTATED LIST OF THESAURI HELD IN THE ASLIB LIBRARY

Compiled for publication by

JANET WALKLEY *and* BARBARA HAY

A RECENT Aslib Research Department Project which investigated problems relating to the construction of thesauri for indexing and retrieval ended with two publications, to be published shortly by Aslib[1, 2]. During the project, extensive use was made of the thesauri held in the Aslib Library, and information about them was tabulated. Information concerning openly available thesauri is displayed below.

The Aslib Library actively collects only the most important thesauri or those which have unusual features (though it is happy to include any donations in its collection). The thesauri held in the Library are normally not for loan, being held in the reference stock.

Readers who are interested in more complete collections of thesauri are referred to the two Unesco clearing-houses (for English, and languages other than English, respectively):

Bibliographic Systems Center,
School of Library Science,
Case Western Reserve University,
Cleveland, Ohio 44106.

and

Centralny Instytut Informacji Naukowo–Technicznej i
Ekonomicznej,
Al. Niepodleglosci 188,
Warsaw.

The following list contains 'lexical authority files' of three types as classified in the publication cited above[1]. Though there is no rigid distinction between the three, the division may be helpful:

(a) *Thesaurus*: Structural list containing cross-references to related terms in addition to references from lead-in terms to preferred terms.

(b) *Term list*: Unstructured list containing any references from lead-in terms to preferred terms.

(c) *Subject headings list*: Structured list containing both types of reference, used as a guide for alphabetical subject indexes rather than, as (a) and (b), for post-coordinate retrieval systems.

The numbers of preferred terms and lead-in terms have been roughly counted by sampling, unless an indication is given in the introduction. The information is tabulated as follows, and arranged in a broad subject order following UDC:

Subject heading
Bibliographic details.
- (a) Subject coverage.
- (b) Type (thesaurus, term list, subject headings list).
- (c) Preferred terms (PT), lead-in terms (LI).
- (d) Brief notes concerning contents and display.
- (e) Miscellaneous notes.

Form

Thesaurus-classification for non-book media.
A. Croghan. London, the author, 1970.
46p.
- (a) Media, including films, maps, paintings, discs, tapes, etc.
- (b) Thesaurus-classification, cf. Thesaurofacet (q.v.)
- (c) PT.84; LI.97.
- (d) Alphabetical list and classified schedules with notation.
- (e) Designed for use only as an extension to subject classification or subject indexing.

Information and Library Science

Thesaurus of information science technology. rev. ed.
Claire K. Schultz. Washington D.C., Communication Service Corp., 1968.
- (a) Information science.
- (b) Thesaurus.
- (c) PT.336; LI.1050.
- (d) Alphabetical list; categorized lists.

A list of subject headings pertaining to library science.
John E. Gray. Vancouver, School of Librarianship, 1966.
32p. (Western Canadian Contributions to Librarianship, no.3).
- (a) Library science.
- (b) Subject headings list.
- (c) PT.300; LI.323.
- (d) Alphabetical list.
- (e) Taken direct from *Subject Headings used in the Dictionary Catalogs of the Library of Congress*, 6th ed. + supplements.

Social Sciences

OECD aligned list of descriptors for economic and social development. [Paris, Organisation for Economic Co-operation and Development], 1969.
5 vols.
- (a) Economic and social development including labour, food, agriculture, trade and industrial relations.
- (b) Term list.
- (c) PT.4860; LI.1735.
- (d) Vol. 1: Categorized lists in 3 languages with source codes (see (e)). Vol.2: Lists of countries and regions, and titles and abbreviations. Vols 3, 4 and 5: Alphabetical lists in English, French and German, each in KWIC format.
- (e) Compiled from the files of the International Labour Office, International Committee for Social Sciences Documentation, Deutsche Stiftung fur Entwicklungslander, Food and Agricultural Organisation of the United Nations and Organisation for Economic Co-operation and Development.

List of descriptors. 2nd ed.
Geneva, International Labour Office, Central Library and Documentation Branch, 1966.
171p. (LD/NOTES/17).
- (a) All aspects of international labour.
- (b) Term list.
- (c) Difficult to assess because in KWIC index form.
- (d) Alphabetical list. Categorized list.

Civil Defence
Civil defense information systems analysis: a feasibility study, of research and information exchange.
W. T. Herzog and J. E. Jenkins. Durham, North Carolina, Research Triangle Institute. Operational Research and Economic Division. 2 vols. (R-OU-158-1). Vol. 1: Text, Vol.11: A thesaurus of civil defense descriptors.
- (a) Civil defence.
- (b) Thesaurus.
- (c) PT.652; LI.1364.
- (d) Descriptor fields and groups. Alphabetical list.

Social Welfare
Manual for hand-sort punch-card system for indexing social welfare publications. 3rd ed.

Colombus, Ohio, National Conference on Social Welfare, 1966.
- (a) Social welfare.
- (b) Thesaurus.
- (c) 12 categories, 50 descriptors.
- (d) Thesaurus of descriptors for use with 65 hole edge-notch cards. In algorithmic form—12 category questions leading to 50 descriptors listed alphabetically together with allowable combinations. Alphabetical index contains 1,200 entries to descriptor combinations.

Education

Information retrieval thesaurus of education terms.
Gordon C. Barhydt and Charles T. Schmidt. Cleveland, Ohio, Case Western Reserve University, 1968.
viii, 133p.
- (a) Education.
- (b) Thesaurus.
- (c) PT.2211; LI.325.
- (d) Alphabetical list. Categorized lists. Permuted index of compound terms.

Thesaurus of ERIC descriptors. 2nd ed.
Educational Resources Information Center, Bureau of Research. [Washington D.C.], Department of Health, Education and Welfare, 1969.
289p. (OE-12031-69).
- (a) Educational research.
- (b) Thesaurus.
- (c) PT.6251; LI.1482.
- (d) Descriptor display group. Descriptor listing. Rotated descriptor display (KWIC).

Science and Technology

Thesaurus of ASTIA descriptors. 2nd ed.
Arlington, Va., U.S. Armed Services Technical Information Agency, 1962.
var.pag. Full ed. + suppl.
- (a) Science and technology.
- (b) Thesaurus.
- (c) PT.4986; LI.3357.
- (d) Descriptors grouped. Alphabetical list. Generic charts.

Thesaurus of engineering and scientific terms: a list of scientific and engineering terms and their relationships for use as a vocabulary in indexing and retrieving technical information.
New York, Engineers Joint Council [and US Defense Documentation Center], 1967.
690p.
- (a) Science and engineering.
- (b) Thesaurus.
- (c) PT.17,810; LI.23,364.
- (d) Alphabetical list. Permuted index of compound terms. Subject category Index, based on COSATI Subject Category List. Hierarchical index, showing levels by indentation.

Thesaurofacet: a thesaurus and faceted classification for engineering and related subjects.
Jean Aitcheson, Alan Gomersall and Ralph Ireland. Whetstone, English Electric Co., 1969.
491p. £8.
- (a) Engineering and related subjects.
- (b) Thesaurus and faceted classification combined
- (c) PT.16,000; LI.7000.
- (d) Faceted classification schedules with a structured descriptor list in place of conventional index.
- (e) Based on 3rd edition of English Electric Faceted Classification. Faceted schedules display main hierarchies, thesaurus displays subsidiary hierarchies and all preferred and lead-in terms. The terms in the two sections are connected by a notation. This is the first thesaurus of its kind.

TDCK circular thesaurus system. 3rd ed.
The Hague, Netherlands Armed Forces Technical Documentation and Information Centre, 1964
846p.
- (a) Military aspects of science and technology.
- (b) Thesaurus.
- (c) 10,431 terms.
- (d) Descriptor fields in two dimensional displays. Alphabetical list.
- (e) Three-monthly updating.

NASA thesaurus: subject terms for indexing scientific and technical information; prelim. ed.
Washington D.C., National Aeronautics and Space Administration, 1967. 3 vols. $8.50.
- (a) Science and technology, including space technology.
- (b) Thesaurus.
- (c) PT.13,364; LI.3416.
- (d) First 2 vols—alphabetical list; vol. 3—hierarchical display, category term listing, permuted index, postable terms.
- (e) based on EJC.

Physics

High Temperature Processes
High temperature thesaurus.
Frances Armes. Leeds University, Information Centre on High Temperature Processing, 1969.
110p
(a) High temperature processes.
(b) Thesaurus.
(c) PT.350; LI.1324.
(d) Alphabetical list.

Electromagnetic Compatibility
ECAC thesaurus of keywords.
R. A. Lambert. Annapolis, Md., Electromagnetic Compatibility, Analysis Center, 1963.
vii, 215p. (AD 439 204. Tech. Mem. no.X. 042A1).
(a) Radio frequency interference, computer applications and mathematical modelling.
(b) Thesaurus.
(c) PT.1321; LI.1709.
(d) Alphabetical list. Separate equipment lists.

Chemistry

ASTIA chemical thesaurus.
Julius From and others. Arlington, Va., Armed Services Technical Information Agency, 1962.
34p.
(a) Chemistry,
(b) Term list.
(c) 1300.
(d) Fragment descriptions chart. Alphabetical list. Miscellaneous terminology and appendix of partial listing of specific compounds.
(e) Extracted from ASTIA thesaurus (q.v.).

Radiation Chemistry
Thesaurus for radiation chemistry.
University of Notre Dame, Indiana, Chemistry Data Center, August 1969.
55p. (COO 38–621).
(a) Radiation chemistry.
(b) Thesaurus.
(c) PT. 144; LI.21.
(d) Alphabetical list and formula list.

Biological Sciences

Biodeterioration
Thesaurus of terms used in biodeterioration.
M. J. D. Willsher. Aston University, Biodeterioration Information Centre, 1967.
378p. (BIC Occasional Publication no. 1).
£2.50.
(a) Biodeterioration.
(b) Thesaurus.
(c) PT.2085; LI.778.
(d) 4 hierarchical levels.

Medicine

Medical and health related sciences thesaurus.
2nd ed. Washington D.C., US Public Health Service, 1969. vi, 460p. (Public Health Service Publication no.1031).
(a) Medicine, dentistry, mental health, allied public health fields.
(b) Subject headings list.
(c) PT.9672; LI.520.
(d) Alphabetical list.

Medical subject headings.
Washington D.C., US Department of Health, Education and Welfare, National Library of Medicine, 1968.
liv, 413p.
(a) Biomedicine.
(b) Thesaurus.
(c) PT.7260; LI.3240.
(d) Alphabetical list. Categorized lists.
(e) The 1968 edition of MeSH is the current revision of the authority list for subject analysis of biomedical literature in the National Library of Medicine. It presents subject headings under which all citations will appear in *Index Medicus*, serves as the basis for search formulations in retrieval by computer of bibliographic citations stored on MEDLARS tapes, and is the standard list for cataloguing books in the NLM.

Anaesthetics
Feature card indexing of anaesthetic literature and Cardiff vocabulary of feature words.
R. M. A. McClelland and W. W. Mapleson London, Association of Anaesthetists, 1966.
48p.
(a) Anaesthetics.
(b) Thesaurus.
(c) PT.450; LI.458.
(d) Classified schedules and alphabetical list.

Bioengineering
Indexed references to biomedical engineering literature...
Medical Research Council, FAIR Project.

(a) Bioengineering.
(b) Term list.
(c) PT.403.
(d) Alphabetical list.
(e) Term lists with slight variations accompany each bibliography and punched card set issued to subscribers.

Systems Engineering
Human factors data thesaurus (an application to task data).
Robert G. Oller. Ohio, Aerospace Medical Research Laboratories, Wright Patterson Air Force Base, 1968.
64p. (AMRL-TR-67-211).
(a) Human factors task information in relation to aerospace system development progress.
(b) Term list.
(c) PT.387; LI.112.
(d) Glossary of acceptable action verbs. Cross-reference index of action verbs. Glossary of acceptable nouns.

Nuclear Safety
NSIC keyword thesaurus.
Oak Ridge, Tenn., Oak Ridge National Laboratory for the USAEC, Nuclear Safety Information Centre, 1967.
var.pag. (ORNL-NSIC-35).
(a) Nuclear safety.
(b) Term list.
(c) PT.2982; LI.1220.
(d) Alphabetical list.

Engineering

Electrical Engineering
Central Electricity Generating Board thesaurus of terms. [London], the Board, 1967.
var. pag.
(a) Engineering, metallurgy, technology in general.
(b) Thesaurus.
(c) PT.6035; LI.2711.
(d) Alphabetical list.
(e) Based on EJC thesaurus. (q.v.)

Welding
A thesaurus for welding and allied processes.
Cambridge, the Welding Institute, 1969.
80p.
(a) Welding and allied processes.
(b) Thesaurus.
(c) PT.1011; LI.376.
(d) Alphabetical list. Generic charts.

Soil Mechanics
Soil mechanics thesaurus.
American Society of Civil Engineers, Soil Mechanics Division.
In: *Journal of the Soil Mechanics and Foundations Division*, ASCE, 93(SM5) 1967, p.18–180.
(a) Soil mechanics, foundation engineering.
(b) Thesaurus.
(c) PT.1550; LI.314.
(d) Alphabetical list. Subject category index.
(e) Based on the EJC.

Road Research
International road research documentation [thesaurus].
Paris, OECD, n.d.
4 vols.
(a) Road research.
(b) Thesaurus.
(c) PT.2600; LI.340.
(d) Alphabetical lists. Two dimensions displays.
(e) In English, French and German. Preliminary edition only with extensive erratum. Based on Euratom approach.

Nuclear Science
Euratom thesaurus: indexing terms used within Euratom's nuclear documentation system. Parts 1 and 2. 2nd ed.
Brussels, Euratom, Center for Information and Documentation.
2 vols. vol.1, 1966; vol.2, 1967.
(a) Nuclear physics, reactor technology and all related subjects.
(b) Thesaurus.
(c) PT.4664; LI.14,518.
(d) Alphabetical list. Two dimensional generic displays.
(e) Alphabetical list contains posting frequency.

INIS thesaurus.
Vienna, International Atomic Energy Agency, International Nuclear Information Service, 1970.
439p. (IAEA-INIS-13).
(a) Nuclear science.
(b) Thesaurus.
(c) PT.9592; LI.5852.
(d) Alphabetical list to be used in conjunction with INIS Terminology Charts. Based on Euratom (q.v.) but differently displayed.

Subject headings used by USAEC Division of Technical Information. 9th ed. rev.
Sidney F. Lanier, Oak Ridge, Tenn., US Atomic Energy Commission, 1969.

276p. (TID-5001.)
(a) Nuclear science.
(b) Subject headings list.
(c) PT.16,432; LI.5382.
(d) Alphabetical list. Standardized subheadings list.
(e) Used in preparing subject indexes to *Nuclear Science Abstracts.*

Transport

Ships

Thesaurus of descriptive terms and code book. 2nd ed.
US Bureau of Ships, 1965.
$4.00.
(a) Ships—engineering, research and development, test and evaluation.
(b) Thesaurus.
(c) PT.5258; LI.3373.
(d) Alphabetical list. Alphabetical list with code words. Code words with descriptive terms.

Aviation

Thesaurus of FAA descriptors. 3rd ed.
Washington D.C., Federal Aviation Agency, 1969.
60p. (AD 686 837).
$3.00.
(a) Civil aviation.
(b) Thesaurus.
(c) PT.3039; LI.1650.
(d) Categorized lists. Alphabetical lists.
(e) Based on ASTIA.

Agriculture

List of descriptors.
Rome, Food and Agricultural Organisation of the UN Documentation Center, 1967.
89p.
(a) Agriculture.
(b) Term list.
(c) Difficult to assess, see (d).
(d) Alphabetic list in KWIC format, with compound terms appearing more than once.

Agricultural/biological vocabulary.
Washington D.C., National Agricultural Library, USGPO, 1967.
2 vols suppl., 1968.
(a) Agriculture and related disciplines.
(b) Thesaurus.
(c) PT.12,879; LI.7128.
(d) Vol.1: Categorized lists; Vol.2: Alphabetical list.

Water Resources

Water resources thesaurus: a vocabulary for indexing and retrieving the literature of water resources research and development.
Washington D.C., US Office of Water Resources Research, 1966.
237p.
(a) Water resources research and development.
(b) Thesaurus.
(c) PT.4139; LI.5372.
(d) Categorized lists. Alphabetical list.
(e) Nucleus of terms from SIE catalogue of water research.

Plant Protection

Regeln und Begriffe fur die dokumentarische Erfassung von Pflanzenschultzliteratur.
W. R. Laux. In: *Mitteilungen aus der Biologischen Bundesanstalt fur Land-und Forstwirtschaft,* (134), 1969.
57p.
(a) Plant disease and protection.
(b) Term list.
(c) PT.331; LI.1,200.
(d) Alphabetical list.

Management

Management information retrieval: a new indexing language.
John Blagden. London, British Institute of Management, 1969.
153p. £3.50.
(a) Management—general, production, personnel, marketing techniques, etc.
(b) Thesaurus.
(c) PT.790; LI.690.
(d) Alphabetical list.

Advertising

Subject headings in advertising, marketing and communication media.
E. B. Christianson and E. G. Strable. New York, Special Libraries Association, 1964.
92p. $5.95.
(a) Advertising, marketing and communication media.
(b) Subject headings list.
(c) PT.520; LI.204.
(d) Alphabetical list.

Chemical Industry

Chemical engineering

Chemical engineering thesaurus: a word book for use with the concept coordination system of information storage and retrieval.

New York, American Institute of Chemical Engineers, 1961.
$10.
- (a) Chemical engineering.
- (b) Thesaurus.
- (c) PT.3809; LI.2189.
- (d) Alphabetical list.
- (e) Superseded by EJC and TEST thesauri (q.v.)

Petroleum

Information retrieval system: subject authority list. 7th ed.
New York, American Petroleum Institute, 1970.
455p. $15.
- (a) Petroleum technology.
- (b) Thesaurus.
- (c) 4049 terms.
- (d) Alphabetical list. Hierarchical index showing levels by indentation.
- (e) Regularly revised.

Exploration and production thesaurus: listing of scientific and engineering terms and their relationships for use in vocabulary control in indexing and retrieving *Petroleum Abstracts*. 3rd ed.
Tulsa, Oklahoma, Tulsa University Information Services Dept., 1968.
viii, 260p.
- (a) Geology, drilling, production of oil and gas, pipelines, etc.
- (b) Thesaurus.
- (c) PT.5470; LI.3587.
- (d) Alphabetical list. Hierarchical index showing levels by indentation.
- (e) Up-dated every four months.

Ceramics

List of English words in use in ceramic technology.
Stoke-on-Trent, British Ceramic Research Association, 1967.
94p.
- (a) Ceramics.
- (b) Term list.
- (c) 2565 terms.
- (d) Alphabetical list showing related terms.

Metallurgy

Thesaurus copier di lavoro in edizione anglo-italiana.
Vera Canepa and Maritana Frigari. Rome–Geneva, Centro Sperimentale Metallurgicos, Pa, 1966.
49p.
- (a) Ferrous metallurgy and allied fields.
- (b) Term list.
- (c) PT 1360; LI.780.
- (d) Alphabetical lists of English terms showing Italian equivalents.
- (e) Preferred terms and lead-in terms in separate lists.

B.N.F. coordinate indexing system: list of terms.
London, British Non-Ferrous Metals Research Association, 1969.
30p. (MP 545).
- (a) Metallurgy.
- (b) Term list.
- (c) PT.593; LI.487.
- (d) Alphabetical list.

Thesaurus of metallurgical terms . . .
Metals Park, Ohio, American Society for Metals, 1968.
224p. $15.
- (a) Metallurgy and allied fields.
- (b) Thesaurus.
- (c) PT.6120; LI.2625.
- (d) Alphabetical list.
- (e) Selected by matching the first ed. of EJC against an existing ASM vocabulary.

Thesaurus of terms on copper technology. 3rd. ed.
New York, Copper Development Association, 1966.
166p.
- (a) Copper technology, metallurgy.
- (b) Thesaurus.
- (c) PT.2875; LI.826.
- (d) Alphabetical list, generic trees. Designations of wrought and cast coppers and copper alloys.

Manufacturing Industries

Paint Technology

Thesaurus of paint and allied technology: a guide to technical terms employed in the US, Canada and the UK.
Philadelphia, Federation of the Societies for Paint Technology, 1968.
272p. $18.00.
- (a) Paint technology.
- (b) Thesaurus.
- (c) PT.2765; LI.329.
- (d) Categorized lists. Alphabetical list.

Paper

Thesaurus of pulp and paper terms: a list of

keywords with their cross-relationships for use in indexing and retrieving information.
J. E. Tasman and P. M. Nobbs. Pointe Claire, Quebec, Pulp and Paper Research Institute, 1965.
97p. $10.
(a) Pulp and paper technology.
(b) Thesaurus.
(c) PT.2147; LI.1171.
(d) Alphabetical list.
(e) A supplement to the EJC.

Textiles

Textile technology terms: an information retrieval thesaurus.
Charlottesville, Va., Institute of Textile Technology, Textile Information Center, 1966.
329p.
(a) Textile technology.
(b) Thesaurus.
(c) PT.3380; LI.2320.
(d) Alphabetical list.
(e) Compatible with the EJC.

Thesaurus of textile terms covering fibres, materials and processes. 2nd ed.
S. Backer. Cambridge, Mass., Massachusetts Institute of Technology, 1969.
448p. £11.70.
(a) Textiles.
(b) Thesaurus.
(c) PT.8000; LI.7200.
(d) Alphabetical list, tables of hierarchic relationships.

Data Processing

Technical information center thesaurus. 2nd ed.
Poughkeepsie, New York, IBM Systems Data Division, 1964. var. pag. (TR 00 1197).
(a) Data processing.
(b) Thesaurus.
(c) PT.5580; LI.1808.
(d) Alphabetical list.

Arts

Thesaurus of coordinate index terms for literature related to experimental research in the arts.
Colombus, Ohio, State University, Center for Experimental Research in the Arts, 1968.
36p.
(a) Arts—painting, sculpture, architecture, music, dance, theatre, literature.
(b) Thesaurus.
(c) PT.1,300; LI.433.
(d) Alphabetical list.
(e) Plan to publish revised versions three times a year.

Planning

Project URBANDOC thesaurus: field test ed.
City University of New York, Department of Housing and Local Development, 1967.
138p. (PB 175 702).
(a) Town planning, renewal and housing.
(b) Thesaurus.
(c) PT.1,320; LI.276.
(d) Alphabetical list. Permuted index to compound terms.

Feature word thesaurus. 2nd ed.
Chelmsford, Essex County Council, County Planning Department, 1969.
£1.25.
(a) Regional planning.
(b) Thesaurus.
(c) PT.717; LI.515.
(d) Alphabetical list.

Thesaurus Landesplannung: deutsch–französisch–englisch.
Zurich, Eidgenossische Technische Hochschule (ETH) Bibliothek, 1970.
220p.
(a) Regional planning.
(b) Thesaurus.
(c) 4000 terms.
(d) One alphabetical list of German, French and English terms each carrying a UDC number. Same terms arranged in UDC order.

Photography

Thesaurus of photographic science and engineering terms.
New York, Society of Photographic Scientists and Engineers, 1967.
130p. $15.
(a) Photographic engineering.
(b) Thesaurus.
(c) PT.2277; LI.655.
(d) Alphabetical list.

Microforms

Thesaurus of microform terms.
B. J. S. Williams. National Reprographic Centre for Documentation, 1969.
38p. £2.50.
(a) Microform reprography.
(b) Thesaurus.
(c) PT.161; LI.80.
(d) Alphabetical list.

REFERENCES

1 GILCHRIST, ALAN. *The thesaurus in retrieval.* London: Aslib. (In press.)
2 AITCHISON, JEAN *and* GILCHRIST, ALAN. *A manual of thesaurus construction.* London: Aslib. (In preparation.)

LATE ADDITIONS TO THE LIST

Pathologie generale et experimentale: thesaurus.
Bulletin Signaletique, Section 350.
N. Dusoulier. Paris, Centre de Documentation du Centre Nationale de la Recherche Scientifique, 1970.
980p.
A thesaurus for pathology.

Subject headings for engineering (SHE).
New York, Engineering Index Inc., 1970.
131p.
A subject heading list used for Engineering Index.

Handro keycode dictionary.
London, Hutton & Rostron, [July 1969–]
A thesaurus for the construction industry issued quarterly to subscribers. Includes set of trigraphs for indexing proper names.

Letter to the Editor

Dear Sir,

MANAGEMENT INFORMATION SERVICES

I have been referred to Mr Cemach's letter in the March issue of *Aslib Proceedings*. As the Manager of the BIM's Information Services, I feel that before the Landau/Bakewell/Blagden correspondence is allowed to die I ought to pass some comment.

Mr Cemach squarely faces a real problem for those concerned with management information in the second paragraph of his letter. He goes on to say that ANBAR feel they must sort the wheat from the chaff, a decision that many will appreciate. I regret that he finds it necessary to extend his letter.

The problem he has raised is one that I too was faced with. My conclusion was that we cannot presume to set ourselves up in judgement. We have decided that our criteria for journal selection should be their relevance to the needs of our members, some 35,000 individuals and 13,500 companies.

All the journals that the BIM takes are used either in answer to specific requests from our members or to help us to deal with the 16,000 enquiries that the Institute receives and answers each year. We check on the satisfaction level of our service.

Yours faithfully,
ROBERT W. BARBER
Manager, Information Services

British Institute of Management,
Management House,
Parker Street,
London WC2B 5PT.
13th May 1971

Correspondence on this subject is now closed. Ed.

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

*Items are available in the Aslib Library and may be borrowed unless marked * to indicate reference copies.*

User Studies

NEW YORK LIBRARY ASSOCIATION. College and University Libraries Section.
Use, mis-use and non-use of academic libraries.
Proceedings of the NYLA, College and University Libraries Section Spring Conference, Watertown 1–2 May 1970. New York: the Section, 1970.
129p.

MANN, PETER H.
Books: buyers and borrowers. London: Deutsch, 1971.
208p.

NEUBAUER, K. W
Informationsangebot und Informationsverhalten in Bibliothek und Dokumentation: Tendenzen und Thesen.
Nachrichten für Dokumentation, vol.22, no.1, February 1971, p.7–13.
The effectiveness of information channels is discussed in connection with use pattern of some user groups in industry and universities.

SRINIVASAN, S.
Impact of user study in the improvement of documentation services in developing countries.
In
FID
Users of documentation, 35th International Congress, 1970, paper I.c.2.
14p.

LUCAS, CHARLOTTE K.
Considerations in planning special libraries and information centres.
Drexel Library Quarterly, vol.7, no.1, January 1971, p.65–9.
Different aspects of user needs considered when planning special libraries.

REVIEW of existing information systems in relation to their suitability for operational use and the criteria that such systems should satisfy. Group study.
In
INTERNATIONAL COUNCIL FOR BUILDING RESEARCH.
Some problems of information flow in the building process, 1970. Session 2, 24p.

REICHARDT, GUNTHER
A study of the documentation centers' relations with its users.
In
FID
Users of documentation, 35th International Congress, 1970, paper I.b.2.
11p.

SAHA, J.
User studies for evaluation of information systems and library resources.
In
FID
Users of documentation, 35th International Congress, 1970, paper I.a.3.
7p.

MARCHLEWSKA, JADWIGA
The information users and their categories.
In
FID
Users of documentation, 35th International Congress, 1970, paper I.a.1.
7p.

SCOTT, RICHARD
Communicating information to users.
In
FID
Users of documentation, 35th International Congress, 1970, paper I.a.4.
25p.

RANGANATHAN, S. R.
Psychology and the natures of the work of users.
In
FID
Users of documentation, 35th International Congress, 1970, paper I.a.2.
10p.

SCHMIDMAIER, DIETER *and* SCHMIDT, GUSTAV
Ermittlung des Informationsbedarfs an der Bergakademie Freiberg.
Zentralblatt für Bibliothekswesen, vol.85, no.2, February 1971, p.94–99.
Determination of the information needs at the mining college of Freiberg: survey of user needs.

MALTHA, D. J.
Information needs in agricultuie.

In
FID
Users of documentation, 35th International Congress, 1970, paper I.a.8.
9p.

PARKER, EDWIN B.
A systems theory analysis of feedback mechanisms for information systems.
In
FID
Users of documentation, 35th International Congress, 1970, paper I.a.12.
23p.

DERE, JOHN R.
Automation and the users of information.
In
FID
Users of documentation, 35th International Congress, 1970, paper III.b.2.
9p.

RAIZADA, A. S.
User-acceptability of information service based on computer printout.
In
FID
Users documentation, 35th International Congress, 1970, paper III.b.3.
10p.

KRUMHOLZ, WALTER
Two user studies as preparatory steps of documentation activities in the social sciences.
In
FID
Users of documentation, 35th International Congress, 1970, paper I.a.7.
5p.

MEYER, ROGER L. *and others*
User study of current awareness and SDI at Celanese Research Co.
Journal of Chemical Documentation, vol.11, no.1, February 1971.
p.24–9.

VAN ANDEL, G. M., *and* VAN ARENDONK, A. P. A. G.
Building of user profiles in the economic field.
In
FID
Users of documentation, 35th International Congress, 1970, paper I.b.6.
11p.

MONGE, FERNANDO
Un estudio de medida para predecir el uso de la biblioteca en una institucion.
Colombiana. [Development of a measuring instrument for predicting library use in a Colombian institute.]
In
FID
Users of documentation, 35th International Congress, 1970, paper I.a.10.
22p.

KSCHENKA, WILFRID
Demand for information and user profiles in education.
In
FID
Users of documentation, 35th International Congress, 1970, paper I.b.4.
20p.

ZAHER, CELIA RIBEIRO, *and* GUIMARAES, YONE Chastinet Duarte
User profiles: study for a future application of SDI to a specific community.
In
FID
Users of documentation, 35th International Congress, 1970, paper I.b.5.
[20]p.

BARNIKOL, ISE
Analyse der Benutzungsfrequenz an der Universitats- und Landesbibliothek Sachsen-Anhalt in Halle/Saale.
Zentralblatt fur Bibliothekswesen, vol.85, no.1, January 1971, p.1–17.
Analysis of attendance statistics at University and State Library of Sachsen-Anhalt, Halle/Saale to identify little used literature.

GRIFFITH, BELVER, *ed.*
Improving library services to users: some research approaches.
Drexel Library Quarterly, vol.7, no.1, January 1971, p.1–69.

EBERT, MARY HILDA
Contrasting patterns of specialized library use.
Drexel Library Quarterly, vol.7, no.1, January 1971, p.13–27.
Some recent user studies and their methods, findings and conclusions.

DAVIS, DIANA L.
New approaches to studying library use.
Drexel Library Quarterly, vol.7, no.1, January 1971, p.4–12.
New approach to methods used for research into library use and users.

ACERENZA, ERMELINDA
Adiestramiento de usuarios. [Training of users].
In
FID
Users documentation, 35th International Congress, 1970, paper II.3.
10p.

PIROG, WOJCIECH
Training students in academic schools.
In
FID
Users of documentation, 35th International Congress, 1970, paper II.1.
7p.

MIKHAILOV, A. I.
The training of information users in the USSR.
In
FID
Users of documentation, 35th International Congress, 1970, paper II.9.
7p.

KEENAN, STELLA
Secondary publications and services: tools for users and training of users.
In
FID
Users of documentation, 35th International Congress, 1970, paper II.7.
13p.

BROWN, JACK E.
The CAN/SDI project: training of users.
In
FID
Users of documentation, 35th International Congress, 1970, paper II.5.
11p.

ARNTZ, H.
El adiestramiento de posibles no-usuarios. [The training of possible non-users].
In
FID
Users of documentation, 35th International Congress, 1970, paper II.6.
6p.

DAVID, A., *and others*
Conocimiento y formacion de los usuarios de documentation. [Knowledge and training of documentation users].
In
FID
Users of documentation, 35th International Congress, 1970, paper II.2.
8p.

HEAPS, D., *and* PAVARS, M.K.
A survey of Canadian user education in science and technology sources.
In
FID
Users of documentation, 35th International Congress, 1970, paper II.8.
21p.

WOOD, D. N.
Training scientists and technologists to handle information.
In
FID
Users of documentation, 35th International Congress, 1970, paper II.10.
24p.

Communication and Knowledge

WOITSCHACH, M.
Interdependency of value and availability of information.
In
FID
Users of documentation, 35th International Congress, 1970, paper I.c.3.
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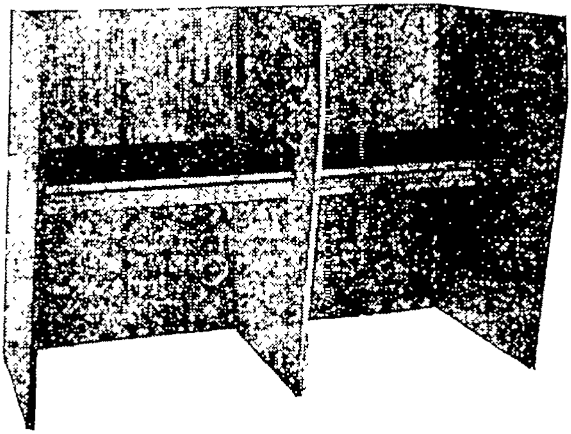

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Cost analysis of a technical information unit KJELD KLINTØE 362

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Volume 23 July 1971 Number 7

ASLIB CALENDAR 1971

September

TUE.14.	Chemical Group evening meeting. 'Patents as a source of technical information', by Miss K. M. Saunderson (ICI, Plastics Division). Aslib 5 p.m.
WED.15.	Computer/Data Processing Group one-day Working Party Seminar. Heythrop College, 12 Cavendish Square, W1.

October

SUN.10–THU.14.	Aslib 45th Annual Conference. Darmstadt, W. Germany.
MON.18.	Social Sciences Group and Technical Translation Group joint evening meeting: 'Translations of social sciences material'. Imperial College, SW7. 5 for 5.30 p.m.
WED.20.	Aslib Evening Meeting. 'Ergonomics and libraries', by J. G. Fox (University of Birmingham). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1. 5 for 5.30 p.m.
FRI.29.	Technical Translation Group meeting. Aslib. 3 p.m.

November

WED.3.	Transport and Planning Group/LA Reference, Special and Information Section one-day Conference. Library Association, 7 Ridgmount Street, W1.
THU.18.	One-Day Seminar: 'Computers and the librarian'. Connaught Rooms, Great Queen Street, WC2.
FRI.19.	Technical Translation Group meeting and sherry party. Aslib. 4 p.m.
WED.24.	Aslib Evening Meeting. 'Administering diffuse collections', by W. Ashworth (Polytechnic of Central London). Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1. 5 for 5.30 p.m.

New members

CORPORATE

(specialized Group interests are given after names, where relevant)

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Institute of Work Study Practitioners	London	D. R. Appelbe
London University—Queen Elizabeth College (*AVG, Bio, Chem*)	London	A. G. Quinsee
National Library of Scotland	Edinburgh	M. A. Pegg
National Research Development Corporation	London	B. Bard
Direccao dos Services de Economia	Loanda, Angola	A. Diogo
NSW Parliamentary Library (*CIG, SSG*)	Sydney, Australia	R. L. Cope
Library Service Centre	Calgary, Alberta, Canada	Mrs A. Vaness
Institut National des Techniques de la Documentation (*CIG*)	Paris	M. de Grolier
Hochschule Information Systems Gmbh (*CIG, Eltron, SSG*)	Hanover, Germany	Dr Krónig
Studiengruppe fur Systemforschung	Heidelberg, Germany	Dr Krauch/Dr Kunz
Royal Scientific Society (*Aero, Chem, Econ, Eltron, Eng, TTG*)	Amman, Jordan	M. A. Itayem
Consejo Nacional de Cienci y Tecnologia	Mexico	Mrs M. de Bustamente

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A. H. Chaplin	London
L. V. Chilton	Much Hadham, Herts.
Mrs B. M. Dumbleton (*Chem*)	Belfast
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Mrs G. B. King	St Paul, Minnesota

Aslib 45th Annual Conference

In deciding to hold the Annual Conference in Darmstadt, West Germany, Aslib saw an opportunity of staging a truly international event—international both in its programme and speakers and in the delegates attending. The generous help of FID and NIDER has made it possible to give the conference very wide publicity in Europe and further afield and up to now, with registrations coming in from Holland, Belgium, West Germany, Sweden, Switzerland, Canada and the USA, one can hope that this object will be achieved.

The advance programme of the Conference gives details of the programme and speakers, which include Dr Martin Cremer, Director of the Institut für Dokumentationswesen and Wilfred Ashworth, Chief Librarian of the Polytechnic of Central London; Brian Edwards of Standard Telecommunication Laboratories and Professor Robert Jungk of the Berlin Centre for Futures Research; N. E. C. Isotta, Head of Service, ESRO, and C. Pelzer, Director of the Division of Scientific and Technical Information, International Atomic Energy Agency in Vienna; Donald Bishop, Director of Management Services, Department of the Environment; Lindsay Corbett, UKAEA; and Professor D. J. de Solla Price of Yale University. Two whole afternoons will be devoted to excursions, which range as far afield as Heidelberg, Mannheim, Frankfurt and the Rheingau. There will also be time to explore the attractions of Darmstadt, professional and otherwise. One of these is the Hessisches Landesmuseum, where natural sciences and the arts—collections of painting, drawing, glass, the 'Jugendstil' of the early years of this century, to name a few—are housed under the same roof, and where the Mayor of Darmstadt, the DGD and the IDW will entertain delegates to an evening reception on 11th October.

The value of such a conference goes far beyond the interest of the individual papers, distinguished as they are, in allowing an interchange of ideas and problems between workers in similar fields where the frontiers of nationalism grow less and less.

For further information and registration and booking forms, write without delay to The Conference Organizer, Aslib, 3 Belgrave Square, London SW1X 8PL.

Vice-President of Aslib honoured

Members will have been pleased to see the name of Dr J. W. Barrett, Director of Research and Development of Monsanto Chemicals Ltd and a Vice-President of Aslib, in the Birthday Honours List. He was awarded the C.B.E.

Besides being a Vice-President of Aslib, Dr Barrett is President of the Institution of Chemical Engineers, a member of the Secretary of State's Advisory Committee on Scientific and Technical Information, and Chairman of the Management Board of the United Kingdom Chemical Information Service. He was until this year Treasurer of the Chemical Society, and has now been appointed President of the new Industrial Division of the larger Chemical Society to be formed in 1972 as a result of the plans for a merger of a number of the principle UK organizations concerned with chemistry.

We offer our sincere congratulations to Dr Barrett on this mark of recognition of his many contributions to science and industry.

Course on teaching methods for librarians and information officers

Last year Aslib ran, in conjunction with Garnett College, Roehampton, a course on teaching methods for librarians and information officers. It was designed for people with considerable experience of library or information work, but with no experience of teaching, who wanted to impart their knowledge to others whether in staff training schemes, as teachers on Aslib or other courses, or in instructing users of their libraries. The course was very successful and was much appreciated by all who attended, and it is therefore being repeated this year.

It is a residential course, held in delightful surroundings at Garnett College. The course has been changed slightly to include a lecture on the role of the library in an educational establishment, by the librarian of the college Mrs J. Lovell. The course will be held from 14th to 17th September. The fee for residents will be £23 (£18 for members of Aslib). People who live near Roehampton and do not wish to be residents will be admitted as non-residents for a fee of £19 (£15 for members of Aslib). A programme of the course was issued with the April issue of *Aslib Proceedings*. Members wishing to attend should write to the Education Officer.

Professional Appointments Register

Members and member organizations are encouraged to make the fullest use of Aslib's Professional Appointments Register. Aslib provides a comprehensive appointments service whose aim is to put forward suitable candidates for placing into professional vacancies in libraries and information services of member organizations.

Candidates for employment: Candidates for employment or change of employment should register with Aslib, providing details of qualifications and experience. Consideration is given to all experienced information officers, professionally qualified librarians, unqualified but experienced library staff and graduates in various disciplines wishing to make a career in information work. Overseas professional staff seeking temporary appointments may also find the service helpful. No fee is charged to candidates either for registration or on appointment.

Prospective employers: The Register is operated by experienced staff who seek to match the employer's requirements with the information about suitable candidates recorded in the Register. The employer makes his short list for interview from the details of selected candidates furnished by Aslib. A fee of 5 per cent of the first year's salary is payable by the employer to Aslib whenever an appointment is made from among candidates put forward by Aslib. No fee is payable if no appointment is made.

All inquires should be addressed to the Education Officer, Aslib, 3 Belgrave Square, London SW1X 8PL.

Economic and Business Information Group

In order to reflect more accurately the interests of its members, Aslib's Economics Group, at its Annual General Meeting on 13th May, adopted the resolution to change the name of the Group to the Economic and Business Information Group.

Guide lines for compilers of research registers in the social sciences

A limited number of copies of this publication, compiled by a working party of the Aslib Social Sciences Group, are now available from the Group's Honorary Secretary, Miss Joan M. Harvey, School of Librarianship, Loughborough Technical College, Radmoor, Loughborough, Leics.

Library research

A seminar on the objectives and administration of library research, organized by the Library Association's Advisory Board on Research, will be held at the University of Nottingham on Monday and Tuesday, 20th and 21st September 1971.

It is intended for heads of library research units, librarians of larger libraries with existing or potential research programmes, senior research workers, research administrators and representatives of research fund bodies.

Among the speakers will be Dr D. J. Urquhart (NLL); Mr E. B. Ceadel (Cambridge University Library); Mr B. C. Vickery (Aslib); Mr J. Mills (North-Western Polytechnic); Mr J. C. Gray (OSTI); Professor W. L. Saunders (University of Sheffield Postgraduate School of Library and Information Science) and Mr M. Yelland (Library Association).

The cost of the seminar is £10. Enquiries should be sent to the Research Officer, Library Association, 7 Ridgmount Street, London WC1 7AE. The closing date for applications is 27th August, 1971.

Organizing committee for the British Library

As foreshadowed in the White Paper 'The British Library' (Cmnd 4572) an Organizing Committee has been established to plan the organization of the proposed British Library and to develop and co-ordinate its policy.

The Committee, which met for the first time on 11th June, is under the Chairmanship of Lord Eccles, Paymaster General with responsibility for the Arts.

The members are:

Mr A. L. C. Bullock, MA, FBA	Vice-Chancellor, Oxford University
Mr E. B. Ceadel, MA	Librarian, Cambridge University
Mr S. P. L. Filon, TD, BSC, FLA	Librarian, National Central Library
Mr K. B. Gardner, BA, ALA	Principal Keeper, Department of Printed Books, British Museum
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Mr M. W. Hill, MA, BSC(OXON), ARIC	Keeper, National Reference Library of Science and Invention
Mr H. T. Hookway	Under Secretary, Department of Education and Science
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Mr M. B. Line, MA, FLA	Librarian, Bath University and leader of the National Libraries ADP Study
Mr D. T. Richnell, BA, FLA	Director and Goldsmiths' Librarian, London University Library
Professor G. D. Sims, OBE, MSC, PHD, DIC, CEng, FIEE	Deputy Vice-Chancellor and Head of the Department of Electronics, Southampton University
Dr T. C. Skeat, FBA	Keeper, Department of Manuscripts and Egerton Librarian, British Museum
Dr D. J. Urquhart, CBE, FLA	Director, National Lending Library for Science and Technology
Mr A. J. Wells, OBE, FLA	Managing Editor and Secretary to the Council of the British National Bibliography Ltd
Sir John Wolfenden, CBE, MA, DLitt	Director, British Museum
Secretary: Mr M. L. Herzig	Department of Education and Science
Assistant Secretary: Miss V. J. Hearn	Department of Education and Science

The Committee's terms of reference are: 'To prepare plans for the organisation, staffing and accommodation of the British Library and to co-ordinate action by the Department and Institutions involved, with the object of ensuring that the organisation comes into being at the earliest date possible as an effective going concern.'

Mature Registration Scheme: Revision

The Council of the Library Association has noted that the existing regulations for the Mature Registration Scheme have made it difficult for mature persons holding posts of professional responsibility to obtain a qualification by this means because of their inability to attend sufficient courses to complete within a reasonable period of time.

In view of these difficulties the Council has recently agreed to a revision of the Scheme whereby in future the major requirement of the Scheme, which is still the accumulation of thirty credits, will be met in the main by the submission of a series of written papers, each of 5,000 words. Some attendance at short courses will also be required, but by no means so many as under the original Scheme, details of which were published in the *LA Record* in March 1969. Exemption credits, which will continue to have an upper limit of six, will remain available in respect of wide experience in library/information work and knowledge of cognate subjects.

Those interested in the Scheme are reminded that it offers a means of obtaining a professional qualification in librarianship, by means other than full-time study, to graduates holding degrees from United Kingdom universities or the

Council for National Academic Awards, or to holders of other qualifications acceptable to the Council of the Library Association as equivalent, who are currently employed in a senior post in library or information work. They are also reminded that no member under the age of 27 years may enrol as a candidate for Mature Registration.

Revised regulations are now being drafted and further information may be obtained from The Assistant Secretary (GJG) at LA headquarters. All those who are already enrolled under the Scheme will be notified of the revised regulations and advised of their position in regard to the revised Scheme.

COMPENDEX Project

The recently established SDI service, COMPENDEX, based on *Engineering Index*, is to be run experimentally for one year, and evaluated in a project supported by OSTI at the School of Library, Archive and Information Studies at University College London. Miss Alexandra Presanis, until recently a member of the staff of Aslib Research Department, has been appointed Research Associate to carry out the project.

Cataloguing rules for non-book media

The Library Association and the National Council for Educational Technology (NCET) have established a Committee to compile a unified, standard code of practice for the descriptive cataloguing of non-book media in libraries and resource centres. Its membership comprises individual experts from a number of specialized institutions and resource centres in the UK, including representatives from Aslib's Audio Visual Group: Roger Holman (Chairman of the Group), Frances Thorpe (Treasurer), Janet Andrew (Secretary) and Helen Harrison (Committee member).

Much of the recent work in this field has been done by the Canadian Library Association and the US Library of Congress, and the new Non-Book Media Cataloguing Rules Committee will be co-operating with these bodies to ensure that British interests will be incorporated in the international standards that will eventually emerge from the work of all three bodies. These standards are likely to take shape as a revised section of the Anglo-American Cataloguing Rules 1967 (AACR). The new Committee will, however, produce in the first instance a self-contained code of rules that can be adopted without reference to AACR.

For further information contact Miss Susan Bradford, Secretary of the Committee on Cataloguing Rules for Non-Book Media, at the Library Association.

International Association of Labour History Institutions

The International Association of Labour History Institutions, which is made up of librarians and archivists in the Labour Movement, was formed at a meeting held on 7th December 1970. Delegates from Scandinavia, Holland, Switzerland, Germany and the UK attended the meeting.

The aims of the association are: 'To foster closer co-operation between librarians and archivists working in the Labour Movement. To exchange ideas, and material where this is possible. To include members from Trade Unions, Socialist Parties, Co-operative organisations and other organisations whose main interest is the Labour Movement.'

The membership fee is £2.00. Further details are obtainable from the Secretary, Mrs I. Wagner, c/o the Labour Party, Transport House, Smith Square, London SW1.

Image storage and transmission systems

The 24th Meeting of the Technical Information Panel of AGARD (Advisory Group for Aerospace Research and Development) will be held on 9th September 1971, at the Norwegian Institute of Paper Research, Oslo, and will discuss the theme: 'Image storage and transmission systems for the dissemination of information.' Leading authorities from the NATO nations will present papers on a number of aspects of this theme, including image transfer, image conversion, image transmission, image display, and Computer Output on Microfilm (COM).

Attendance at the meeting is by invitation only and is normally limited to citizens of the NATO nations. Anyone in the UK who wishes to attend should apply to: Mr S. C. Schuler, UK Member, Technical Information Panel, Technology Reports Centre, Station Square House, St Mary Cray, Orpington, Kent BR5 3RE. (Tel. Orpington 32111, ext. 35). Those in other NATO countries should apply to their own AGARD National Delegate or Panel Member for an invitation.

Seminar on user needs

A residential seminar, entitled 'New perspectives 1971: discovering and satisfying user needs', is being organized by the College of Librarianship Wales, to be held at the College from 13th to 16th September 1971. The aim of of the seminar is to offer to young librarians, many of whom are now in positions of responsibility, the opportunity to learn of and discuss those aspects of librarianship, including new ideas developed since they left college, that they now encounter in their daily work.

The papers will be directed towards practical discussion of working situations and will be concerned with what has been done, what can be done, and what is worth doing in order to discover and satisfy user needs. Speakers will include Geoffrey Ford, David Batty, Denis Grogan and Tony Foskett.

Application forms and further details are obtainable from the Liaison and Training Officer, College of Librarianship Wales, Llandbadarn Fawr, Aberystwyth.

International Food Information Service

International Food Information Service has recently announced a number of secondary services using material published in *Food Science and Technology Abstracts*. *FSTA* covers over 1,200 primary journals in food science and technology and the number of abstracts has increased from 12,000 in volume 1 to 16,500 in volume 3.

The secondary services to be made available include:

1. *Magnetic tapes*—containing all the information published in *FSTA*. The cost of leasing twelve monthly tapes is about £700.

2. *Current awareness*—references, abstracts, etc. can be supplied up to two months ahead of publication of *FSTA*.
3. *Retrospective search service*—'state-of-the-art' searches will cost from £5–£7.50 per volume of *FSTA* searched.
4. *Food Annotated Bibliographies* (*FABs*)—six *FABs* have already been published, bringing together recent abstracts on specialized topics in food science and technology.

Further details about these secondary services can be obtained from: International Food Information Service, Commonwealth Bureau of Dairy Science and Technology, Shinfield, Reading RG2 9AT (telephone: Reading 883895).

Welwyn Hall Research Association—Abstracts Service

Welwyn Hall Research Association, whose research interests cover the fields of Lime, Whiting and Colloid Science, Calcium Silicate Bricks and Building Technology and Powder Technology, have begun to use a card system for their monthly Abstracts Service. This system replaces the journal format of the *Digest*, now no longer published by the Association.

An average of 1,500 6 x 4 inch cards are produced each year, and the charge to non-members for this service is £10 p.a. A back-up photocopying and loan service is also available. Further information is obtainable from the Librarian, Mrs M. G. Clarke, at the Welwyn Hall Research Association, Church Street, Welwyn, Herts.

Information service on industrial health and safety

A new information service on topics concerned with health and safety in industry was recently introduced by Data Retrieval Limited. Called *Buck's Safety Management AID* (Augmented Index and Digest), it will initially take the form of a bi-monthly publication presenting the latest published information on matters relating to occupational health, industrial safety, loss prevention and fire protection. Each issue will have two main sections: a KWIC (Keyword-in-Context) index to recently published articles, books and reports; and a classified guide to the index.

The cost of the service will be £15 per annum. Further details from: John Buck, Data Retrieval Limited, 370 Harold Road, Hastings, Sussex.

Latest volumes of UDC

Seven new sections of the Universal Decimal Classification have recently been published by the British Standards Institution.

These are: BS 1000(32) *Politics* (80p); BS 1000(64) *Home Economics* (£1.20); BS 1000(66/66.09) *Chemical and related industries. Chemical technology* (£1.40); BS 1000(336) *Finance. Public Finance. Customs, banking and monetary system* (£1); BS 1000(666) *Glass and allied industries. Ceramics, clay and allied industries. Gypsum, lime, cement and allied industries* (£1.40); BS 1000(676) *Pulp and paper industry. Production of pulp, paper and board* (£1).

Copies of these volumes are obtainable from the BSI Sales Branch, 101 Pentonville Road, London N1 9ND.

Library medals awards

Three Library Association medals, the Besterman Medal for a bibliography, the McColvin Medal for a work of reference, and the Wheatley Medal for an outstanding index, were presented at a special reception held at the LA on 25th May.

The Besterman Medal was awarded to *English theatrical literature, 1559–1900*, by J. F. Arnott and J. W. Robinson (Society for Theatre Research). Commended in this section was a bibliography compiled by the Economic Research Unit of the Board of Trade, in collaboration with the Board of Trade Library, entitled *Competition, monopoly and restrictive practices* (HMSO) (see brief review in July 1970 issue of *Proceedings*, p. 305).

The McColvin Medal for a reference work was awarded to *Councils, committees, and boards: a handbook of advisory, consultative, executive and similar bodies in British public life*, edited by I. G. Anderson and published by CBD Research Ltd (see brief review in October 1970 issue, p. 478).

The recipient of the Wheatley Medal was E. L. C. Mullins, Librarian of the Royal Historical Society, for his index to *A guide to the historical and archaeological publications of Societies in England and Wales 1901–1933* (University of London, Athlone Press, 1968).

For further information, contact Mr M. Yelland, Research Officer, Library Association, 7 Ridgmount Street, London WC1 7AE.

People and places

MR P. HARVARD-WILLIAMS, at present Librarian at Queen's University Belfast, has been appointed Director of the Library School at the University of Ottawa. Mr Harvard-Williams has been Librarian at Queen's University since 1961 and was also, until last October, Director of the School of Library and Information Studies. He is also a Vice-President of the International Federation of Library Associations (IFLA) and Vice-President and Chairman of Council of the Library Association.

BRIEF REVIEWS

INDUSTRIAL RESEARCH LABORATORIES OF THE UNITED STATES. 13th edition. Edited by Jaques Cattell Press. Temple (Arizona): Cattell; New York: Bowker, 1970. 659 pp. $43.50. (ISBN 0 8352 0237 2)

As in previous editions, the listings in this volume are limited to non-governmental laboratories devoted to fundamental and applied research, including development of products and processes. Most of the laboratories included in this edition are owned and operated by industrial firms, but some university, foundation and co-operative laboratories that have separate research facilities are also listed. For the first time in this directory coverage has been expanded to include organizations engaged in investigations in the social and behavioural fields.

This edition alphabetically lists 5,237 laboratories, representing the efforts of 3,115 organizations. In general, basic content of individual entries follows the same pattern established in previous editions. Each entry includes the name and address of the company and divisions or subsidiaries which are involved in research; names and addresses of laboratories; names and titles of chief administrative and research executives; the number of professional staff with doctoral degrees; and the number of employees in each field of research and development with the number of doctorates in each discipline. Listings also give a description of each laboratory's chief research activity. This edition has excluded details of whether research and development is performed for the parent company only or also for others, and the major activity of the company is no longer indicated.

Each entry is now numbered and this is a useful addition to the directory. However, the typeface is smaller and the general arrangement of entries makes them less clear than in previous editions.

The subject index, absent from the previous edition, is an important guide to the main research activities of each laboratory. Also of value are the personnel index (which includes senior research personnel not listed by name in the main entries as well as personnel included in the main section) and the geographical index.

MILLARD, PATRICIA, *comp.* Trade Associations and Professional Bodies of the United Kingdom. 5th edition (revised and enlarged). Oxford: Pergamon Press, 1971. 469 pp. £6.00. (SBN 08 016596 6)

The fourth edition of this publication appeared in 1968. It covers trade associations, qualifying bodies, learned societies, research associations and other organizations which represent the 'interests and welfare' of any trade industry or professional sector. Regular amendment lists are to be published.

In most cases the only information given about each organization is the name, address and telephone number; a brief annotation is included if the subject interest of the body is not obvious from the title. An asterisk indicates if the address of the organization is likely to change before the next edition of the directory appears.

As in previous editions, the directory is divided into three sections: (i) alphabetical list of trade associations and professional bodies; (ii) chambers of commerce, trade, industry and shipping; junior chambers of commerce arranged geographically; (iii) United Kingdom offices of international associations, arranged alphabetically with a subject index.

PENROSE ANNUAL 1971. Vol. 64. Edited by Herbert Spencer. London: Lund Humphries, 1971. £5 cloth (SBN 75331 290 7); £3.50 paper (SBN 85331 289 3).

The introductory Survey chapter somewhat dramatically sets the scene for the graphic arts: 'It was a year of breakthroughs in printing technology. For the British printing and newspaper industry, 1970 was also one of the more difficult years ever suffered, even if in some ways one of the more hopeful. . . . It was the year in which 3M announced its Driographic plate, which is lithography without water [the Annual contains a full-scale article by its inventor, J. L.

Curtin]. Two systems for solventless inks were introduced. Water-based inks were announced for gravure. A new electronic scanner producing screened separations was developed which uses a digital computer. . . .'

The Annual contains twenty-four contributions of which eight have a direct bearing on documentation and are therefore worth noting here:

Garsed, E. B. (National Cash Register). 'Microfilming microfilm: a photochromic process.' The uses of PCMI.

Beverley, J. (Westminster Press). 'Typewriters to the rescue.' Some of the disadvantages of photocomposition and webb-offset.

Carlick, D. J. 'The suncure system.' Ultra-violet drying of inks and coatings in milliseconds. This new American development is now at the field-testing stage.

Wallis, L. W. (Crosfield Electronics, Phototypesetting Division). 'Typesetting metamorphosis.' An analysis of the computer-controlled typesetting installations at some seventy-eight British plants, as at October 1970.

Winser, A. D. (Inveresk's Northfleet Mills). 'A look at paper.' A review of significant breakthroughs in recent years.

Whitaker, D. (J. Whitaker & Sons). 'Book listing by computer.' The production of the Whitaker bibliographies and book trade papers.

Cooper, D. L. and Nield, C. D. (PIRA). 'Printing and computers: the changing scene.' An assessment of the available equipment and its proper use for the printer.

RODGERS, FRANK. Serial publications in the British Parliamentary Papers, 1900–1968: a bibliography. Chicago: American Library Association, 1971. 146 pp. $7.50. (ISBN 0 8389 0086 0)

This book sets out to identify and list, by agency responsible, the serials that have appeared in the House of Commons Sessional Papers between 1900 and 1968. It seems a surprisingly slim volume, however, when one considers the number of publications over these years which must form its potential content.

Its selectivity necessitates its use largely in conjunction with other indexes, such as the HMSO catalogue, *Government publications*, and the *General indexes*, especially since House of Commons Paper numbers, for example, are not quoted.

In the main sequence, agencies—except for those of Eire and Northern Ireland, which are treated separately from the main sequence but in the same section following it—are listed alphabetically, often with a useful brief description of their historical development. Title entries are given alphabetically under their issuing agencies, and numbered consecutively. Each entry may include title, volume and date; notes about the title; parliamentary and non-parliamentary publication; and reference to the *General indexes* by subject heading. There is a combined subject and agency index, referring to the running numbers of the entries.

A large part of the introduction is devoted to a description of the Sessional Papers themselves and indexes and guides to British Government publications, and this description alone should be found useful.

In its place amongst other guides and indexes to British Government publications, this book should prove helpful to anyone who needs to identify such publications.

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANISATION *and* THE INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS. UNISIST: synopsis of the feasibility study on a world science information system. Paris: Unesco, 1971. 92 pp. Free.

A Unesco/ICSU Central Committee to study the feasibility of a world science information system was set up in 1967, the British representatives being Dr H. Coblans, Aslib, and Dr H. T. Hookway, Department of Education and Science, and the results of their four year study are contained in the final report of the Committee, published by Unesco in 1970, of which this is a summarized version.

The Committee set up a number of Working Groups to study such problem areas as internationally accepted abstracting forms and procedures; evaluation and compaction of scientific information; research needs of a world system; language problems in transferring scientific information; specific problems of developing countries; and bibliographical description. These problems are discussed and brought together in the final report which concludes that a world scientific information system is not only feasible but necessary if the future information needs of world scientists are to be met.

The synopsis outlines the developments leading up to the UNISIST study, sets out the proposed programme for encouraging and developing the voluntary co-operation on which the idea rests, lists twenty-two specific recommendations for achieving the desired objectives, and attempts to show the benefits which would ensue from such a system.

The report is, in fact, a blue print for the creation of a more rational system for exploiting and developing world resources of information in science and technology. UNISIST, however, is more than just a feasibility study. It is an attempt to re-affirm the philosophy of unrestricted interchange of scientific information by devising means for overcoming the barriers to effective interchange, using modern communications technology and the present world-wide movement towards increased international co-operation as tools for developing an optimum system of information transfer, at a cost which society is prepared to pay.

WASSERMAN, PAUL *and others, eds.* Statistics sources: a subject guide to data on industrial, business, social, educational, financial, and other topics for the United States and selected foreign countries. Revised third edition. Detroit: Gale Research Co., 1971. 647 pp. $27.50.

This third edition of *Statistics sources* sets out fundamentally to identify the primary sources of national and international statistical data available: publications, and sometimes organizations. As well as updating the 1965 edition, this volume, according to the publisher, adds 3,000 new subject classifications, primarily in international statistical information, and is 50 per cent larger than the second edition. Also included in this edition is a selected bibliography of key statistical sources, which is an annotated list of important general statistical compendia in the English language.

However, it appears that for countries other than the USA which are included, almost every source of statistics given is the *United Nations Statistical Yearbook*, with no acknowledgement to the national statistics from which the *UN Yearbook* is compiled. For the UK, for example, the *UN Yearbook* is the only source given for statistics for every subheading listed. Admittedly, the *Yearbook* has been comprehensively indexed, but this in no way justifies the exclusion of a large number of other possible sources.

WORDS AND DOCUMENTS

The Fifth Aslib Annual Lecture

delivered by

HERBERT COBLANS

CHAIRMAN: SIR JOHN WOLFENDEN, CBE

Senate House, University of London, 9th June 1971

THOSE OF US who look back on a lifetime of work in librarianship, documentation and education—what is nowadays called communication—are often tempted to try to define our terms. Subconsciously we are probably trying to separate the sheep from the goats. Precision in terminology is necessary, especially in the sciences. But what I am going to talk about is more akin to the arts. I would like to take a more general, broader view of our function, our stake in the continuity and the quality of civilization as a whole.

Our stock-in-trade can be simply described—words packaged in documents. These documents, and they include all forms of recording, are stored in libraries, and it is by the quality of the description of their contents that they are made usable. More and more we are beginning to understand how difficult this is, how little we know about the laws of this 'description'. In and around this complex process we have built up a sort of theology—we believe in many gods, major, minor and, of course, false ones. With the concession that bias and prejudice are hard to avoid, I shall state my credo, but I would like to think that it is shared by a fair number of my colleagues. The major ones are: the word and the literacy it implies, the primacy of information, knowledge as a common heritage and free for all, and order. The minor ones include tradition, the 'user', the author and standardization. Some of the false ones are: the unique system universally applicable, the perfect meta-language which will solve all indexing problems, and probably the machine.

There is bound to be some conflict between major and minor, as for example between standardization of routines and the standardization of natural language. Standardization is an absolute priority but only in matters mechanical (intellectually trivial levels) and administrative. Clearly we sin against the spirit of an industrialized society, with its efficiency through mass production and interchangeability, by condoning the folly of the confusion in microforms, by accepting the anarchy of commercial enterprise which ensures that no compatibility exists between the various codes and practices in data processing. Or to come nearer home, how can we justify the insistence on individualistic local cataloguing rules which ensure that the same book is expensively catalogued *de novo* in academic libraries all over the world?

Switzerland is an example of a country which maintains a good measure of low-level standardization, but not in language. The problem is how to achieve the right compromise between *laissez-faire* and planning. Above all, as a profession we must steadfastly oppose the shallow materialism that makes a philosophy out of taxes on knowledge, public enlightenment and education. The fact that a small country like Switzerland has four official languages (and a number of additional variants)* is very significant.

Natural language should not and cannot be standardized. Any such attempts would be treason against the human spirit, and, of course, it would not work. Just as nature has evolved in a panoply of forms (which man has all too often succeeded in making extinct) so speech is the evolving characteristic of man in all his glorious diversity—what Shaw in *Pygmalion* called 'the divine gift of articulate speech'. That implies a multiplicity of growing and changing languages. Esperanto, or any other artificially standardized language, can only function as a common language of communication at a very inadequate level.

Perhaps the most valuable insights into the problems of information retrieval came with the growing understanding of the key role of natural language in the fifties and the early sixties, undoubtedly stimulated by the pioneering work of Cleverdon and his team in the Aslib Cranfield Project. Already in an address given in 1938 Niels Bohr,[2] the great Danish theoretical physicist, had pointed out that:

> 'As regards reason compared with instinct, it is above all essential to realise that no proper human thinking is imaginable without the use of concepts framed in some language which every generation has to learn anew.'

In the post-War period the euphoric impact of computer achievements was both salutary and seriously misleading. It has introduced, if only by negative influence, a flowering in the discipline of linguistics and once again 'language' and 'mind' have become closely linked, especially in the work of Chomsky,[3] in contrast to the more behaviouristic school of B. F. Skinner,[4] also at Harvard. In a recent book Chomsky[3] has stated that:

> '. . . an appreciable investment of time, energy and money in the use of computers for linguistic research . . . has not provided any significant advance in our understanding of the use or nature of language.'

On the other hand, it would probably be fair to say that the rigour demanded in the handling of textual material in a computer has shown up large gaps in linguistic studies, especially in syntactics and semantics.

> 'Honesty forces us to admit that we are as far today as Descartes was three centuries ago from understanding just what enables a human to speak in a way that is innovative, free from stimulus control and also appropriate and coherent.'

If Chomsky's contentions are correct, they have far-reaching consequences for machine translation, automatic indexing and 'free text searching'.

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* Julian Huxley in his *Memories*[1] records a fascinating example of such variants in bird song: 'As we tramped round the estate I heard an unfamiliar song: I went off with my binoculars and discovered that it was a common chaffinch, singing in what might be called a local dialect. (These local song-forms are handed down by tradition, the young birds remembering their parents' song-type when they start singing next spring.) The Africans were delighted to find that British birds, like African tribes, have their own dialects.'

A very instructive insight into the problem, particularly in its implications for computerized information retrieval, was provided a few years ago by A. G. Oettinger,[5] Professor of Linguistics at Harvard University. He examines the simple and apparently unequivocal sentence:

Time flies like an arrow

and shows that there are three possible syntactical structures, and therefore three entirely different meanings for this statement.

	ADJECTIVE	NOUN	VERB	NOUN	ADVERB	
1.		Time	flies		like	an arrow
2.	'Time'	flies	like			an arrow
3.			Time	flies	like	an arrow

(To clarify the meaning of each of these sentences a rough French translation follows:

1. *Le temps s'envole comme une flèche.*
2. *Les mouches (genus) 'Temps' aiment une flèche.*
3. *Chronométrer, avec la rapidité d'une flèche, les mouches.*)

He goes on to say that:

> 'No techniques now known can deal effectively with semantic problems of this kind. Research in the field is continuing in the hope that some form of man-machine interaction can yield both practical results and further insights into the deepening mystery of natural language. We do not yet know how people understand language, and our machine procedures barely do child's work in an extraordinarily cumbersome way.'

While the vigour and variability of natural language defies standardization, and hence automation, it is our privilege as documentalists to live with it, our responsibility to elucidate it, and to campaign against its abuses. It is particularly instructive to collect examples of living language, and in recent years there has grown up a rich crop of such cross-fertilization between English and French, English and German, etc. Thus, recently, the publication of a new French dictionary led to an inspired invention. For some time the famous *Littré,* the French *OED,* has in effect been displaced by the seven-volume *Robert.* Now (in 1969) they have issued a one-volume version—*le petit Robert,* and obviously it is known as '*le mini Bob*'!

Another example would be the idiomatic translation of new and evolving concepts. The French are supposed to have a saying: 'A translation is like a woman: if faithful, it is not beautiful, and if beautiful, not faithful.' Well, I have come across a 'translation' which is both delightful and faithful to the national temper of France. Their version of 'work to rule' is '*grève du zèle*', which one might render roughly as a 'strike with excessive fervour'. Such is the genius of language, and inevitably the computer remains illiterate in the face of it. Or more correctly, it is not the computer but rather our inability to devise algorithms which can analyse language and simulate its generation.

Above all, within the English language, even in our own field, new terms, both good and bad, are continually being coined. A topical one is 'anti-preprint'. It appeared in 1970 in a new periodical[6] with the title 'Preprints in particles and fields and anti-preprints'. The anti-preprint section contains the bibliographical references to the published versions of former preprints. Thus we have come full circle and I offer a new definition of a periodical: 'A periodical is a collection of anti-preprints.' But seriously, the anti-preprint is a real contribution to the relief of the bibliographical confusion which the widespread and haphazard distribution of preprints has caused.

If a common language of communication is not a meaningful aim, are there any viable solutions in the real world, where technology is fast eliminating the traditional frontiers, both linguistic and political? Clearly there are no unique and simple solutions. At best, we can foster a few of the great languages of human discourse. The choice tends to be inevitable rather than equitable—English, French or Spanish, Russian, and very soon Chinese. These will probably be increasingly accepted as the languages of international exchange. Each national group with a 'local' language could then choose at least one international language as *its* 'switching language'. (Such unusual peoples as the Dutch and the Scandinavians would probably continue to handle a number of European languages.)

This would mean that the main tools of documentation, the forms of information transfer, need only be standardized in a few key languages. Then it would be up to each local language group to make the necessary arrangements for linking with its chosen international language. Of course it must be realized that this would stir up powerful political and psychological forces, as language has always been both an instrument of *rapprochement* and of 'cultural imperialism'. The newer media of mass communications have only aggravated this further. The best safeguard is that the number of international languages should not be restricted too much. However, each new one added enormously increases the burden of translation concordance and interpretation.

The implications for the documentalist who has to ensure access to the subject content of documents are basic and far-reaching. From the language of the original document there must always be an analysis and conversion to the metalanguage (standardized description) of indexing and classification systems. Our present techniques are still rather crude approximations—alphabetical subject headings, hierarchical classification schedules, co-ordinate indexing, citation indexing, etc. The great hope since the fifties, especially in technical and industrial libraries, has been that the computer would provide the answer, be it by automatic indexing or by what is now called 'free text searching'. I shall be discussing this question in more detail later.

II

It is just about ten years ago that a Canadian Professor of English issued a book, *The Gutenberg galaxy,* which we as librarians must take seriously, particularly as its author has achieved the fame (or the notoriety) of a modern Spengler. Marshall McLuhan[7] has become a much quoted prophet and he is certainly a master of the striking half-truth and the dogmatic overstatement, not least in the areas that are relevant to the 'word' (especially in its spoken form) and the 'document'. None the less, two such perceptive and critical writers as J. Miller[8] and G. Steiner[9a] concede that his insights, though often based on doubtful history or bad theory, are stimulating; and that he is helping to provoke the literary Establishment into a re-examination of such fundamental questions as:

What is a book?
How do we read?
What is the function of literature?

Therefore it might be useful to consider some of McLuhan's aphorisms, particularly those that relate to our field and express in more extreme language what many of the 'machine' men and the 'futurologists' are saying in their own way:

(a) The medium is the message.
(b) One can consider language as a technical medium which exists independently of the mind which uses it.*
(c) The phonetic alphabet began the fatal dissociation between the senses. Most civilized people are crude and numb in their perceptions, compared with the hyperaesthesia of oral and auditory cultures. For the eye has none of the delicacy of the ear.
(d) By translating *all* aspects of the world into the code-language of *one* sense only—the reading eye—the printing press has hypnotized and fragmented Western consciousness.[9]
(e) The Roman Empire crumbled because supplies of papyrus from Egypt were cut off.
(f) 'Authorship'—in the sense we know it today, individual intellectual effort related to the book as an economic commodity—was practically unknown before the advent of print technology. Medieval scholars were indifferent to the precise identity of the 'books' they studied. In turn they rarely signed even what was clearly their own . . . The invention of printing did away with anonymity, fostering ideas of literary fame and the habit of considering intellectual effort as private property.[7c] (McLuhan's explanation of copyright is very relevant. It is no accident that the computer storage and publication of information, on-line 'dialogue' with computers through terminals, has led to the most serious crisis in the law of copyright in this century.)

But it is in his insistence on the medium that the essence of his approach lies. For him the technology of communication determines the way people think, behave and see the world. He implies that the microphone, the radio, and more recently, television and computers are making the book, the periodical, the learned paper, obsolete—and he would add 'good riddance'. Similar warnings have come from the computer experts. Thus a former director of research at IBM, J. C. R. Licklider,[10] in his book *Libraries of the future*, stated the case for 'non-libraries' of 'non-books'. An earlier, though related misconception was very fashionable in the sixties—conventional libraries are heading towards a breakdown, engulfed in a literature explosion.

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* This formulation of McLuhan doctrine by Miller[8] is typical of his assumptions.

The early demise of such vestigial relics as the book has often been prophesied:

> 'Books will soon be obsolete in the schools. Scholars will be instructed through the eye. It is possible to teach every branch of human knowledge with the motion picture. Our school system will be completely changed in ten years.'[11]

That was Thomas Alva Edison writing in 1913. (Essentially what McLuhan has done is to add the ear to the eye as manifested in the medium of television.) There is little doubt that the central position of the book as educator in a humanistic sense is being eroded. In a series of articles which appeared in *The Times Literary Supplement* on the 'The future of the book', Steiner[9b] pointed out that recent estimates put the literacy of over 50 per cent of adults in the USA at the level of 12-year olds. In other words, we are facing a growing sub-literacy in Western culture.* (In the other world of the developing countries, illiteracy is actually growing both relatively and absolutely.) Steiner quotes the rather special example of France with its old tradition of the personal book collection. A 1969 survey established that the *per capita* consumption of books is of the order of one per year, indicating a sharply declining readership. But all this does not make the book redundant—it shifts the emphasis from hard back to paper back, from ownership to borrowing. Public libraries in the UK still lend approximately 500 million books per year.[12]

Of course, for the forward-looking enthusiasts the book was never fully 'with it' anyway—they are more concerned with the periodical. For more than thirty years the question has been repeatedly asked: Is journal publication obsolescent?[13, 14] During the past ten years we have had some very revealing user studies. The research projects of the American Psychological Association[15] on the structure of formal and informal communication of the literature of psychology have provided very relevant results. They showed that just over 80 per cent of communication between research workers lies outside the scientific paper. In other words, the average psychologist gets less than 20 per cent of his ideas and information from reading his literature. This more than confirms what has long been suspected—scientists in general do not read, they talk. It also explains the rather depressing statistical fact that, on average, each scientific paper is referred to, i.e. cited, only *once* per annum in its useful lifetime.

None the less, this does not mean that the periodical as a form of publication is becoming obsolete. As long as human perception (our animal physiology) and the way in which scientists work remain much the same, the scientist, the scholar will depend on the *orderly* presentation of new information. The history of the periodical bears this out. Ziman[16] has put this point rather delightfully:

> 'It is extraordinary to consider that the general form of a scientific paper has changed less, in nearly 300 years, than any other class of literature except the bedroom farce.'

Those who see this problem purely as one of collection, storage and communication, for which the computer can certainly provide efficient solutions, are neglecting the essential nature of learning and research. What is the difference between a learned periodical and a collection of papers, stored in a computer, on tap to anyone who is prepared to learn the rules of on-line dialogue? The contents of a scientific periodical are controlled and modified by those who produce the knowledge, the scientists themselves. Above all, they co-operate within the framework of the traditions of the learned society with its editors and its referees. The final result of all this intellectual effort (correction, clarification, condensation) is a published paper, easier to read, to understand and to use. It has become the first step in the transmutation of information into that recorded knowledge which is continually re-appraised and slowly matures into the consensus which is scientific thought at any given moment.

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* A tendency which McLuhan would probably welcome.

It is not so much how the subject content of a periodical can be efficiently retrieved[17]—the vast arena of conflict which I should like to call 'Cleverdonia'. Rather the formal paper, as presented in the published periodical and later evaluated in the annual review, is an essential part of the discipline of confrontation with one's own peers as critics. In this way, data and information become knowledge and understanding—alchemy becomes chemistry!

III

While insisting that it is not the medium but rather the content that matters, I want to stress that organization or order is what makes the content meaningful. The often quoted example of Copernicus illustrates this point.[18] Essentially he made sense out of the complex helices of Ptolemy by moving the origin of the co-ordinate system—a revolutionary insight. As has been rightly said, the organization is the information. It is thus not an accident that the creation of order has always been and will remain one of our major aims. Classification is a basic part of that order.

It is true that we happen to be in a temporary phase where classification is rather a 'dirty' word, especially among information scientists. They are, of course, obsessed with the fascinating problems of information retrieval from sets of documents, as collected in large technical libraries. Admittedly the use of the words of a natural language in automatic text processing—indexing with computers—is very attractive, as it promises reduction of costs by eliminating a number of expensive information specialists and benefiting from international sharing by exchanging magnetic tapes. But in the long run, I am convinced that hierarchical classification must be part of the training and the conceptual framework of librarians and documentalists. Each generation must organize knowledge broadly in a meaningful way, preferably in some internationally acceptable form, if they are to be able to serve their clients properly. Excessive specialization on the one hand, and the growth of border disciplines on the other hand, make this even more imperative.

In the history of documentation there is a periodic change of emphasis as to how much intellectual effort must be applied to recognize patterns of order and thus obtain efficient retrieval. Present research, above all the work of Cleverdon[19] and Salton[20], point to:

> '... the surprising conclusion ... that, on the average, the simplest indexing procedures which identify a given document or query by a set of terms ..., obtained from the document or query texts are also the most effective.'[20]

This means that the single term (the word) is more effective than the concept as an indexing device. Also it greatly favours the computer approach, where single words can be handled more effectively than composite headings. There is growing evidence to suggest that automatic indexing methods are no longer inferior to manual means; actually both are equally inefficient in extracting the documents relevant to a particular question. But since searching for words in titles of articles involves less intellectual effort, it can be done fairly easily by programming a computer. In terms of cost/benefit, this explains why 'free text searching' has become so popular. Thus very recent studies in Oxford by Lynch and Smith[21] have compared the computer service of the Chemical Society (University of Nottingham) based on the magnetic store of *Chemical Titles,* with a manual search of the literature. They found that more than 90 per cent of desired information can be retrieved mechanically at a level satisfactory for most commercial and scientific purposes.

Particularly in certain subjects, like chemistry and law, where texts contain a high proportion of fairly standardized words, usually rich in information content, this approach seems to be worthwhile for large technical units with narrowly defined subject interests. As a solution of the indexing problem for the whole range of the bibliographical record, the computer technique remains crude, makeshift and inadequate in my view.

More hopeful are the ideas worked out in an indexing technique which uses controlled terms and faceted classification in full association. Jean Aitchison[22] calls this retrieval language tool the 'Thesaurofacet'. It is interesting but not surprising to see how all the efforts during the past twenty-five years to eliminate classification are ending up in hierarchy coming back in a hidden form or, as in this case, quite openly. Admittedly it requires human indexers to assign index terms and so will cost more in comparison, when computer costs fall further, as they are bound to do. However, it must be accepted once and for all that, if scientific research and technological applications are worthwhile, then the cost of recording the results in documents and making their contents adequately accessible by subject is basically just as important as the original research, and is part of the cost of that research.

Another interesting development is the project of the Groupe d'Étude sur l'Information scientifique of the CNRS working under J.-C. Gardin in Marseilles. (Since 1965 a number of international meetings have been arranged.) The Groupe has compiled an outline Intermediate Lexicon for information science, which would permit the conversion of indexing terms in one system to a different one; e.g. from the keywords of a thesaurus A to a list of subject headings B, or thesaurus F in French to thesaurus E in English. This would depend on the viability of an intermediate indexing language,[23] which would have to resolve a range of semantic ambiguities and hierarchical incompatibilities. Its value, in reducing wasteful duplication and profiting from international sharing of the indexing load, would be considerable. Thus subject analysis and indexing carried out by one centre could be taken up ('translated') into the retrieval language of another centre, anywhere else in the world. OSTI has provided a grant for the testing of such a principle at the School of Librarianship of the Polytechnic of North London.

IV

So far computers have not been as effective as was originally hoped for in the more 'intellectual' aspects of information retrieval; the achievements understandably are mainly in the mechanization of administrative routines, housekeeping in libraries and in printing. But on the other hand, their potentialities can hardly be over-estimated and their impact on social organization could produce a structure very different from our own.

Technically, that is in terms of hardware, it is quite feasible for all types of recorded information, the contents of documents, images, sound, stored in one computer centre, to be transmitted at high speeds to libraries, schools, even individual homes anywhere in the world. Within an average-sized country the telephone lines can be the channel. For very long distances it would be done through communication satellites.[24] Since that memorable day, the 6th of April 1965, when the first satellite of this kind 'Early Bird' was launched at Cape Kennedy, the number of words that can be transmitted through a microwave channel has increased to something like 4 million per minute.

It is not too fanciful (see Martin and Norman,[25] *The computerized society*) to think of the Post Office towers that carry these microwave antennae as the symbol of our electronic age, dwarfing the Gothic spires and the Eiffel towers of the nineteenth century. However, the question we should be asking is, how can we use such power to communicate, to what purpose, and for whom? As always in human affairs, technology must be related in a meaningful way to the facts of life: usefulness, costs, maintenance and reliability, standardization and intelligibility. To maintain such a world network there would have to be a large-scale re-organization of existing, and a creation of new, national information services at the broadcasting and the receiving ends. This would presuppose an investment in man power and equipment, and a freedom of international exchange almost unthinkable in our present climate of national rivalry, all in a world which is more than half illiterate and where the gap between the 'haves' and the 'have-nots' is widening.

But let us take a narrower view and see what has been done and what can reasonably be expected from computers in the advanced countries. Already in the early fifties when the first experiments in mechanized information retrieval were under way, teaching machines had obvious attractions. They fit naturally into the theories of behaviouristic psychology[4] and the already mentioned concept of language as a technical medium rather than a creative form of mental organization. One American critic[26] has put it another way:

> 'The impetus to mechanized education was first supplied by Sputnik and the Ford Foundation; the first created the hysteria, and the second provided the money.'

Here was a market of great promise for the electronic industries. By 1962 there were over one hundred commercial companies making such machines. The advantages of CAI (computer-assisted instruction) were widely discussed in the literature; it was all very reminiscent of the inflated claims made for computerized IR. They are, of course, closely related areas of man-machine interaction.

As usual the most searching evaluation of these developments has been made in the USA. A very useful report by A. G. Oettinger[27] of Harvard appeared last year in the Harvard series of 'Studies in Technology and Society'. When he gives it the sub-title 'The mythology of educational innovation', he is not being a reactionary Luddite. He is speaking in sorrow rather than in anger, from the full consciousness of the insider who has worked with all the resources of the famous Multi-Access Computing system, the Project MAC at MIT. Cambridge, Mass., with its Chomskys and Skinners has become the great centre for these controversies, as Cambridge, England, was *the* focus for atomic physics in Rutherford's day.

The great promise offered by CAI is the 'individualization of instruction'—each child should be able to move forward at its own pace of learning. Computer terminals in each classroom linked to central information pools would change the whole process of education. But would they change the sorry picture of the public (in the American sense) or primary schools as we know them in most parts of the world? That can be done only by smaller classes, better trained teachers, by adequate school libraries, etc., and all that costs money. So far these technical devices have not lowered the costs per pupil, in fact rather the reverse. A few years ago RCA was leasing this sort of educational machinery at $50 per year per student.[27] CAI can no doubt be made effective, but it would need a very large investment in programming effort. According to Martin and Norman[25] present costs are of the order of $10 per pupil hour and would have to drop down to $1 to become feasible. The result is that computers at present are mainly used in education for clerical and administrative routines, thus closely paralleling the position in documentation.

Yet in some ways the situation is more encouraging in the handling and publication of information. In particular, printing using computer-aided typesetting is going from strength to strength. In the early days a whole generation of librarians felt a real sense of bibliographic revulsion at the sight of line-printer output with its 48 characters (all caps), its closely packed lines and poor impression. But nowadays 'the computer can . . . speak in the cultivated language of bibliography, and not merely, as hitherto, in a bibliographic pidgin English'.[28] Not only can the highest quality of printing and the widest range of characters be met, but an entirely new dimension of flexibility and selectivity is possible. From a single typing, with all the necessary printing and indexing instructions added, a periodical with, in due course, all its cumulated indexes can be printed with speed and accuracy. The contents can be re-arranged in the computer store in any desired manner and printed out in any specified format. Parts of this store can be duplicated automatically for use by other indexing, abstracting or current awareness services. And all this at prices that are becoming competitive with conventional printing. By the end of the sixties already more than a thousand computers were being used in printing shops in different parts of the world, about two thirds of them for newspapers.[29] It is these capabilities which have resulted in an increasing number of international subject services based on duplicate magnetic tapes. In a sense they are by-products from the compilation and printing of periodicals like *Index Medicus*, *Chemical Titles*, the INSPEC trio of abstracts and the *INIS Atomindex*, or in a different way the internationally shared cataloguing included in the MARC tapes.

In a general and very significant sense there are two important consequences.

Firstly, the conversion fsom manual to computer operation must be preceded by a critical examination of the purpose and the structure of each procedure broken down minutely step by step. This is grandiloquently called Systems Analysis, but we have long known it as a standard routine in applying the scientific method. Such studies are very rewarding, especially in situations where the accretions of decades have built up conventions and traditions, where means too often become divorced from objectives, as for example in librarianship.

Secondly, almost as a throw-away, computer control provides a wealth of statistical information of direct use for management and policy-making.[30] In any large public or university library the mechanization of the circulation records would provide benefits out of all proportion to the extra cost incurred. Such parameters as the growth of the literature in various subjects, user distribution and population growth, book demand in relation to supply (reserved books), obsolescence, inter-library loan strategy, can be continuously checked. Trends can thus be measured and long-term planning need no longer be based on global and inadequate annual statistics.

However, it is in this virtue that a great danger lurks—the electronic invasion of privacy. The computer is a ruthlessly efficient tool for the ultimate control of all aspects of our lives. This clear conflict between a mechanical efficiency and personal freedom is becoming more and more obvious. The advantages of a single information file which would integrate the data of scores of government departments (vital statistics, police record, education, library usage, tax and bank status, medical, employment and social security history, and so on) are obvious; but so is the nightmare of such a world of total information. A Cambridge sociologist and a computer specialist have analysed the position very well in their book, *The data bank society*.[31] Their recommendations are entirely reasonable. Personal information should not be assembled in one master file but remain in separate and unrelated computer stores. Each store should have elaborate protection, admittedly costly, against infiltration, misuse and corruption of the facts. It must be accepted that there are certain records that are so sensitive that they should not be put into computers at all.

V

Documentation almost from its beginnings has been very much concerned with science, both in its methodology and its content. Our criteria, our ideals are circumscribed by the scientific method; our clients, especially in the large centres, the information Establishment, are mainly scientists and technologists; our literature is full of the problems of 'science information'. For those of us who grew up between the Wars the scientific gospel was one of those 'gods' that I spoke of at the beginning. The shattering events of the forties have made some of us more sceptical.

It is perhaps necessary and salutary to look critically at these tenets so as to avoid the twin dangers of Scylla and Charybdis. On the one hand, there is that 'scientism' which has been defined[32] as 'the belief that science knows or will soon know all the answers'. On the other hand, there is the negative view, often associated with youthful protest, that blames science for all the sins of society.[33]

Not long before his death last year, one of the founding fathers of modern physics, Max Born, recorded his honest doubts and fears in the book *Physics in my generation*.[34] He compares the introduction written in 1921 for his book *Einstein's theory of relativity* with a postscript to his *The restless universe* of 1951, a time gap of only thirty years.

> 'In 1921 I believed . . . that science produced an objective knowledge of the world, which is governed by deterministic laws. The scientific method seemed to me superior to other, more subjective ways of forming a picture of the world—philosophy, poetry, and religion . . . In 1951 I believed in none of these things . . . deterministic laws had been replaced by statistical ones . . . physicists . . . had contributed nothing to a better understanding of nations, but had helped in inventing and applying the most horrible weapons of destruction. I now regard my former belief in the superiority of science over other forms of human thought and behaviour as a self-deception. . . . Still, I believe that the rapid change of fundamental concepts and the failure to improve the moral standards of human society are no demonstration of the uselessness of science in the search for truth and for a better life.'

There is no doubt that the middle of the twentieth century was a watershed both scientifically and morally; and I think we should start accepting the consequences!

Scientific discoveries are unpredictable and cannot be planned in the ordinary way, but their applications in industry are controllable, if we so wish. Science and technology move on without pause, the latter feeding on the former through complex and not very efficient information channels. We must foster the former and limit the latter to serving human ends. It is here that there comes the implacable clash between the sociologist, the ecologist and the classical economist who demands more economic growth, more technology. But this sort of *laissez-faire* is a dangerous luxury. It can wreck urban and rural life, foul up our ecology and impose the unending burden of repairing 'the damages wrought by the technology of yesterday'.[35]

Pure and applied scientists with a social conscience have long been warning us. In 1968 the Editor of *Science*[36] drew attention to these implications in an editorial entitled 'The inexorable exponential'. He pointed out that the electrical power industry in the USA had been increasing its installed capacity at around 7 per cent per annum (a doubling every ten years) creating enormous problems in siting, air and water pollution. He goes on to say that, if we are concerned about our long-term future, we should regard rapid growth in any industry with suspicion and slow down before it is too late. It is encouraging to find that so distinguished an economist as Galbraith has been expressing the view, in his Fabian Lecture in 1970, that unrestricted economic growth can be an evil in advanced countries. Elsewhere he has argued that it does little for those at the bottom of the economic ladder, and the remedy is 'taxation that is seriously and energetically redistributive'.

In conclusion may I try to draw the threads together. For the foreseeable future, books and periodicals will not disappear, they will be extended and supplemented. New technology will modify rather than revolutionize our methods of treating information. In this context civilization can be seen as an accretion and an integration of evolutionary changes. We are not just the keepers of the documents; we must also be the interpreters who match the reader with the document through the handling of words and symbols. By our classifications, by our indexing we must contribute to that synthesis which presents each generation through its books, each culture through its artefacts.

And now let me put a more personal question. What are the geriatric joys for those who work with books and are at home with the printed word? For myself a few of them would be: the new and significant correlations that spring from order and hierarchy, the insight and understanding that are the gifts of time and experience, the recognition of the same basic concepts which continually recur in new forms, the growth of a sturdy internationalism in spite of all the setbacks.

My final plea is that human relationships should always take precedence over mechanical efficiency. I can illustrate what I would like to call the 'machine fallacy' in the following way—a sort of analogy. The latest marvel of reprography is PCMI (Photo-Chromic Micro Image). I have here the complete Holy Bible on a sheet of laminated microfilm (2" × 2"). This is a highly efficient medium for storing 1,245 pages. But efficient for what purpose? This medium is not relevant for those to whom the Bible means so much. They can carry it around with them but they cannot read it. I am not questioning the technical excellence of PCMI when used in its right and limited place. Therefore let us not bow down too easily before these golden calves.

Above all let us keep librarianship and documentation with a human face!

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POLICY ISSUES AND THE DEVELOPMENT OF INFORMATION SYSTEMS

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Introduction

> 'We are sitting watching each other's navels, blinded by the beauty of ourselves and our systems.'[1]

Forgive my starting with so inelegant a quotation, used earlier this year at a meeting of computer professionals by a speaker who was criticizing the 'incestuous' nature of the discussions in their closed circle: I am sure that it does not apply to the present meeting. But it *does* apply to meetings of many kinds of technical specialists where no opportunities are given for people outside the family circle to listen, to criticize, and to present their own viewpoints. The quotation also raises important policy issues, to which I shall return later.

These words, 'policy' and 'issue', are going to occur frequently during this talk. Both of them are awkward words in international working, because in many languages there is no way of distinguishing between 'policy' and 'politics', and the word 'issues' can only be translated as *problems—questions—themes,* which can mean either less or more than we understand by *issues.*

Even in English, the concept of 'policy' is familiar enough, but it can mean different things to different people; and these differences may have far-reaching implications. In non-incestuous discussions it is important to get the distinctions clear.

For example, a national information policy may be a statement of an objective: 'our policy is that every school child shall learn to use a computer'. It may be a statement of choice: 'our policy is to develop Excerpta Pornographica rather than continuing to support Erotophysiological Abstracts'. Or adoption of a technique: 'our policy is to promote use of microfiches'. Or a negative: 'our policy is to reduce our dependence on imported hardware'. Or a strategy: 'our policy is to move towards greater international co-operation'. And so on.

What does the dictionary say?

> '*Policy*: shrewdness based upon considerations of expediency; a projected programme consisting of a set of objectives and the means to achieve them.'
>
> (*Webster's Third New International Dictionary, 1961*)

You may feel that I am being a little frivolously cynical in including the first of these definitions; but the second and more serious definition already goes well beyond what many countries possess in the way of national information policy. Indeed, one policy issue to be faced at the highest level in government is whether a *single* information policy is desirable and feasible in the particular national circumstances. Remember that if a single focus for co-ordinating policy does not exist, 'policy' decisions may be taken by individual government departments on a purely local basis, perhaps without reference to, or even in conflict with, those of other departments, and may be viewed by the department concerned as *management* rather than policy decisions. In such a situation, *policy issues* may seem unreal, or of theoretical interest only.

But they are not unreal. In a talk to Aslib last year[2] I explained OECD interest in this field and described the work of the Information Policy Group, which brings together officials in OECD member countries who have responsibilities (which vary widely from country to country) for promoting and co-ordinating information activities at the national level. I also described briefly the 'national focuses' for information that have been set up now in most of our member countries, and the way in which their responsibilities are developing and changing. Some focuses are sharper than others! But this is less significant than that they *exist,* and provide a recognized place where issues of importance to information developments can be discussed at national level.

There is, incidentally, almost as much confusion about the meaning of 'issues' as of 'policy'. *Webster* offers us a choice here, too:

> *Issue*: a point of debate or controversy; a matter not finally settled and on the settlement of which something else depends; a pregnant, unsettled matter; a vital question; a controverted subject or topic; something entailing alternatives between which to choose or decide; something involving judgments or decisions.

From time to time suggestions are made that the development of information systems is so important an issue that government should leave industry/private entrepreneurs/professional societies/to deal with it. However, vested interests are usually conspicuous behind these suggestions.

In the talk to Aslib already mentioned,[2] I explained why OECD believes that government must be involved. These reasons were set out in a paper to the OECD Ministerial Meeting on Science in 1968,[3] and were the basis for the ministerial recommendation that the national focuses should be set up.

In fact, these reasons were summed up in a phrase by Mr Wedgwood Benn, when, as Minister of Technology, he gave the keynote speech at an OECD Seminar last year on 'Government Responsibilities in Information for Industry'[4]: '*Information is our most valuable resource.*' He believed that governments should assume responsibilities in six aspects of this resource:

(i) the creation of information by economic and scientific research and development;
(ii) the evaluation of the accuracy of the information and its indexing, processing and up-dating;
(iii) the construction of vast computer banks and data transmission systems on the ground and in space, to provide the necessary mechanical framework for handling and moving this information;

(iv) the development of software systems to allow these facilities to be used by the customers for these services;
(v) the general development of, and training in, the skills of application that are necessary to use the information as it becomes available;
(vi) the market research operation designed to discover exactly what information people really need, or are likely to need, to do their jobs, and when those needs are likely to arise.

He concluded by saying that: 'if we fail to develop within the right institutional framework we shall not stop what is going on. But we shall find, later on, that we are buying all the equipment, and the information (including information we have generated ourselves) from others who have had greater vision. That road would be the road to ruin.'

So much for the preamble: what do I intend to say?

- Firstly, something about the *objectives* of a national information policy.
- Then, the *issues* that OECD Members say they are concerned with. (In parentheses, I should emphasize that these are *real* objectives and *real* issues, not ideas that I have invented for this paper: they are the issues that the responsible officials in our member countries tell us they are facing at the present time.)
- Then some recommendations for *action*: first broadly, then, by way of example, in relation to information for industry.
- Then, some questions to *you*. I put them now, so that you can keep them in mind while the different issues are presented:
  (a) Do these objectives and issues look relevant to what *you* are doing, or what you would like to do?
  (b) What part should *you* play in the formulation of a national policy for the kind of information *you* want?
  (c) *How* do you do this? Through Aslib? Professional or scientific societies? Trade associations?
  (d) *Who is missing* in this room? (i.e. how incestuous are we?) The ultimate users of the information? How are their voices to be heard? A user's charter? A kitemark or seal of approval, guaranteeing that quality control has been maintained at all levels (the quality of the information itself, the quality of the system and of the service offered from the system)?
  (e) What about *repackaging* of information? Who is experimenting with new means of *presentation*? What do we put at the *user-system interface*?—an interactive remote terminal or a less remote little red-head? Which will catch the user's interest and bring him back a second time? The answer will be different in different cases!

Information technology is now so powerful—at least potentially—that planners and policy-makers must be sure they know what you want to use it *for*. It is so expensive that it must be used *efficiently*.

I. OBJECTIVES OF A NATIONAL INFORMATION POLICY

After the 1968 Ministerial Meeting on Science, the Secretary General of OECD called together a group of senior advisers to examine the concepts of information policy in the context of government policies more generally.[5] This Group identified four primary goals for information policy:

(i) to ensure the effective utilization of accumulated knowledge in science, technology, economics and social science in order to achieve national objectives for the betterment of society;
(ii) to promote the development of science and technology;
(iii) to ensure the availability of adequate information for decisions for management and for policy both in government and in private enterprise;
(iv) to focus the attention of governments and private organizations on the problems of information availability and use.

Within the framework of these broad national goals there are more specific requirements which constitute the major policy objectives for national governments:

(i) to ensure the availability of scientific, technological, economic, and social information adequate for national needs;
(ii) to ensure that access to other national and international information sources can be obtained;
(iii) to determine, if possible, the relationships between scientific and technological information and information about social phenomena;
(iv) to ensure that all this information is properly selected, digested, and analysed for educational, industrial, policy and other public purposes;
(v) to ensure that resources are available to study the habits and needs of information users, and to study new practices in information processing;
(vi) to ensure that resources are available for the establishment and operation of appropriate information systems;
(vii) to ensure that the management responsible for central co-ordination has the breadth of view to encompass the systems management skills, appreciation of user requirements, understanding the potential of library systems and the power of modern information technology, without being preoccupied with any one of these to the exclusion of the others;
(viii) to ensure that an adequate mix of properly trained subject specialists and information processing specialists is available.

II. ISSUES OF NATIONAL INFORMATION POLICY

A. The National Focus for Information

Meanwhile, a number of the national focuses for information have become established, and an analysis of their activities gives a set of more operational questions relating to practical policy making:

1. What should be the balance of interest, and the organizational relationships, between the national information, R & D and other science- or technology-oriented policies?
2. How can we improve the allocation of national resources (money and manpower) between different types of library and information activity?

(This presupposes a knowledge of present resource allocation, and in most countries this means that greater effort is required in the measurement and analysis of resources.)

3. What should be the role of the national library system in a national information network?
4. What is the best method of financing mechanized disciplinary systems as they become operational, i.e. how far should they be financed by users and how far by government subsidy: how far from general library or information budgets and how far from subject-based funds?
5. How do we ensure an effective multi-departmental approach to the national information policy? Where do we locate the national information focus, and how do we fund it?
6. Should information development projects be funded by a central source or focus, or through *ad hoc* 'project financing' by one or more interested government departments or agencies?
7. Should the national objective be a central information store, or decentralized to special disciplinary or mission-oriented institutes?
8. How far do government responsibilities go in operational activities directed to information dissemination? How much should be left to the private initiatives of the professional societies or the information industry?
9. What information services should be provided for small and medium sized industry?
10. What attention must be paid to legal aspects, e.g. copyright, access, privacy, accuracy, misuse?
11. What machinery is needed to ensure effective co-ordination between public and private sector information services?

B. Present preoccupations

A recent survey of the issues facing governments in this field, undertaken by OECD as a guide to its own programme priorities, identified a wide range, from which the following list has been drawn:

Structure and organization of information networks

1. What are the roles of different components of information networks: primary publications, libraries, documentation centres, SDI services, retrospective search services, data banks, etc.? What are the criteria for evaluating their performance?
2. What are the advantages and disadvantages of centralization in large mechanized information systems? Should we aim at a centralization which is international? Or multi-national by geographical region or by language? Or at the national level? In considering a degree of centralization, are we concerned with input, with information storage and central processing facilities, with output, or with any combination of these?
3. How should a data bank network be organized nationally or internationally? Discipline- or mission-oriented? Where are the problems of interconnection and how can they be tackled?
4. What kind of information networks are required for specific purposes such

as 'information for management', 'for policy', or 'for small and medium industry'?

5. How can the major information services in a country be brought together most effectively? How can the interface between mechanized information systems and their users be optimized? What kind of switching centres are needed? What scope is there here for application of modern management techniques to improve the organization of large information systems?
6. How are the public relations and promotional tasks of different kinds of information systems best handled? What is needed in the way of user training?

User needs

1. How do we define and identify the 'user need-groups'?
2. How do we forecast the development of the needs of different user need-groups?
3. How do we compare the efficiency of different information services in responding to user needs?
4. How should information be presented and distributed to facilitate its assimilation by different user groups?
5. What new kinds of information service should be developed to respond to the economic and social objectives of the nation? What specialized ancillary services are needed to complement these efforts: popularization, use of mass media, retraining, etc.?
6. What should the relations be between education and information?

Personnel and Training

1. What qualifications are required of key personnel in major information systems? What special training facilities are required?
2. What kind of salary scales should be envisaged for information personnel?
3. How far can we forecast future needs for trained information specialists? What institutional developments are implied by these needs?
4. How can we raise the professional status of information work and further the career development of those who enter it?

III. ACTION: POLICY AND ITS IMPLEMENTATION

The group of senior advisers I mentioned in section 1 made a number of recommendations to the Secretary General concerning the work of the OECD, and also many others addressed directly to our member governments. The main elements of these recommendations can be summarized as follows:

1. Regarding the usefulness and applicability of information systems, that:
   (i) governments assign due importance to the consequences that these information issues have for their countries, to the need for national action, and for developing these concepts further within the framework offered by the OECD;

(ii) STI policies be developed as an integral part of the design of policy as a whole, and of R & D policies in particular;

(iii) scientific and technical information be seen in a larger context, embracing not only the natural sciences and technology but also social science information;

(iv) greater support from governments be given to mechanisms for ensuring effective interchange of information among scientists, giving explicit recognition to the key importance of informal systems including personal contact and oral communication (interdisciplinary information exchange and various kinds of information analysis, consolidation, evaluation and repackaging are important here also);

(v) governments determine the actual patterns of technical information use in industry and examine the utility of government-sponsored scientific and technological information systems in the light of these patterns;

(vi) experimental development of special systems should be initiated in a few priority problem areas, to see whether it is practicable to serve in a unified system the needs of researchers, engineers, administrators, policy-makers (work now beginning in OECD in relation to the environment and urban development may provide some models);

2. Regarding quality control of both content and procedures of information systems, that:
   (i) government authorities critically examine the quality of the information on which decisions are to be based, to ensure that systems contain adequate feedback and checks;
   (ii) new information systems also use feedback to guide their own adaptation and evolution towards more effective satisfaction of user requirements, both now and in the future;
3. Regarding education for information system needs and for social needs, that:
   (i) government assume responsibility for developing trained personnel to participate in the design and operation of the information systems envisioned in the report;
   (ii) the re-evaluation of educational requirements of modern societies should take full account of the need for information transfer systems better adapted to the continuing re-education of adults;
4. Regarding international co-operation and the needs of member countries, that:
   (i) increasing reliance on the strengthening of international co-operation should be developed as a means for using the store of human knowledge more efficiently for the benefit of mankind;
   (ii) member countries should design their own R & D policies to take account of the world knowledge to which they can obtain selective access by proper investments in information transfer systems; in the case of smaller countries this may include pooling resources.

IV. ACTION: INFORMATION FOR INDUSTRY

By way of example, I should like to present a set of proposals for action in a specific sector of information: information for industry. These were the fruit of an OECD Seminar on 'Government Responsibilities in Information for Industry',[4] and summarize the participants' views on what these responsibilities should be. A majority of the participants were themselves government officials concerned with these issues, but about forty representatives of industry and the scientific societies ensured a fair debate. They believed that government should:

1. Review and keep under continuous evaluation the evolving needs of industry for different kinds of information (both technological and non-technological), in relation to existing information services.
2. Promote the use of information by industry through information liaison officer services and by use of the technical press and the mass media, and refer industrial users to appropriate information sources in the public and private sectors.
3. Co-ordinate initiatives in information, in both public and private sectors; encourage the private sector to fill gaps identified in existing services; and support those necessary services, such as Information Analysis Centres, not provided by (or not financially attractive to) the private sector.
4. Where needed, set up information 'wholesale warehouses', from which information services in the public and private sectors, and in individual firms, would be able to draw.
5. Maintain contact with the government departments offering information and information services of value to industry, and advise on effective standards, presentation and promotion of their use.
6. Promote the effective reporting and dissemination of the results of government research and development.
7. Undertake or promote R & D on information transfer to industry and within the firm.
8. Liaison with national patent offices to ensure effective use of the information in patents.
9. Promote licensing agreements through periodical lists, SDI services and personal contacts.
10. Provide education and training for the information personnel required by industrial information services, including those *within* industrial firms; and promote efficient *use* of information through appropriate training, public relations and liaison.
11. Monitor legal, fiscal and other government measures affecting the 'innovative climate', and advise and co-operate with the departments concerned.
12. Maintain close contacts with national focuses in other countries, to ensure that optimal use is made of international opportunities for information exchange and for providing larger markets for information services (e.g. Information Analysis Centres) that would otherwise be uneconomic.

Note that in many of these points it is suggested that government need not be active as the *operator* of information services, but has the responsibility to ensure that *somebody* is doing what has to be done, and to promote and co-ordinate efforts nationally or internationally.

V. A NATIONAL INFORMATION POLICY

So far I have spoken mostly about governmental policy. This is natural: I belong to an intergovernmental organization, and, anyway, long-range planning is at present almost a government monopoly in almost all countries where it is happening at all. But is this enough? Is there not a danger of a little incest here too? In all countries a *national* information policy contains many non-governmental issues—to the point that, until recently, in some countries the national policy has been developed more or less in absence of governmental participation.

Looking at the different sets of issues I have presented, two points stand out. Firstly, no single group of information producers, processors or users could possibly assume responsibility for the whole picture we have been examining here—the canvas is too vast. Only government can encompass the total range of these concerns, objectively and with the resources to back up its interest. Secondly, the point is clearly made in many of these issues (especially in section IV) that government should provide the leadership functions, acting as co-ordinator, promoter, catalyst but *not* necessarily as the operator of information systems. There is a requirement that government seeks to *ensure* availability, access, effective utilization, etc; but 'ensuring' does not necessarily mean doing it oneself: rather, having identified the needs, government should see that *somebody*, somewhere, satisfies them.

Government has inevitably to assume the major overall responsibility here for the wise management of the nation's 'most important resource'. Government must be involved at the highest levels of leadership: goal-setting, co-ordination, funding, education and promotion of new means and channels of technical communication. But in the national situation, who else plays contributory roles?

A part of the answer is given in the 'Weinberg Report', the subtitle of which it is important to remember: 'The Responsibilities of the *Technical Community* and the Government in the Transfer of Information' (my italics). Its opening sentence is:

> 'Transfer of information is an inseparable part of research and development. All those concerned with research and development—individual scientists and engineers, industrial and academic research establishments, technical societies, Government agencies—must accept responsibility for the transfer of information in the same degree and spirit that they accept responsibility for research and development itself.'[6]

Nobody now would dispute this. If government is to co-ordinate the management of the flow of information, others who are concerned at any stage of the information process must play their parts conscientiously and agree to work within the co-ordinating guidelines. But is this enough?

Information transfer processes are seen increasingly as a cybernetic system, adapting itself (at present very creakingly) in response to complex pressures and feedbacks. It is vital that these feedbacks work effectively, in relation not only to operations but also to the design and forward planning of national and international information networks, systems and services. These are—or should be—orientated towards their users. The users, and those people in information services who are closely concerned with the users, *must* provide the appropriate feedbacks. Unless they do, there is a danger, real or imagined, that the government's planning machinery may work (incestuously?) towards the greater efficiency of *The Plan,* but not sufficiently in touch with reality to keep the plan and its objectives pointed in the right direction. This is a common fear among people who do not understand how government works.

In fact, how real a danger is this? At the present time, and on the face of it, it is not very real—largely because the governments of OECD member countries in general bring about the co-ordination of information activities through advice and/or funding, not by mandate or sanctions. If the advice is unrealistic or unwanted it tends to be ignored; and funds in this field are not so freely available that government will insist on paying for work to be done in the teeth of opposition or militant apathy on the part of potential grantees.

But the pressures are building up. Even if the information growth curve is showing signs of flattening off a little, the amount and variety of information are going to continue to increase into the foreseeable future. As potential users become better informed about the opportunities offered them by new kinds of information services, the number and variety of the actual users of these services will grow. The feedback loops into the planning machinery must report these changes, sensitively and accurately, if government responsibility is to remain responsive to the new needs and new opportunities that are developing.

This will require effort on the part of all those of you who are operating information services. Apart from your responsibilities to your users, for the quality, relevance and completeness of the services you offer, you have national responsibilities as well. How does what you are doing fit into the national developments? Can it contribute to them, or make more effective use of them? You are all planning for the future—your individual futures. Do your plans have elements which may be better tackled co-operatively? Do they fit into the emerging pattern of evolving national information activities. Indeed, do you feel that *you* know *enough* about the national plans in this area? Enough to know that they make sound economic and technical sense in relation to your requirements?

The interaction between the public and the private sectors in the planning and development of information services should be an active one. The rate of change, and the time available to us, no longer permit either sector the luxury of ignoring the needs and progress of the other, or of observing it passively in the hope that things will work out all right in the end. Information *is* our most valuable resource. It is a costly resource to exploit, and will become more so in the future. The benefits *must* increase in proportion to the costs. A dynamic forward-looking *national* policy for information can help to ensure this. You, as vital elements of the national information network, must be sure that you play your full part in contributing to this policy.

NOTES AND REFERENCES

1 Ed Williams (Managing Director of Attwood Auerbach Ltd). Quoted in *New Scientist,* 11th March 1971, p. 575.

2 JUDGE, P. J. Intergovernmental plans and achievements: OECD and other international bodies. *Aslib Proceedings,* **22,** 8, August 1970, p. 368–76.

3 See, for example: A scientific and technical information policy. *OECD Observer*, no. 33, April 1968, p. 36–8.

4 The proceedings of this Seminar are available from OECD.

5 This report, entitled *Information for a changing society*, will be available shortly from OECD.

6 US PRESIDENT'S SCIENCE ADVISORY COMMITTEE. *Science, Government and Information: the responsibilities of the technical community and the Government in the transfer of information*. Washington, 1963. (Chairman: A. M. Weinberg.)

COST ANALYSIS OF A TECHNICAL INFORMATION UNIT

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Based on a paper presented at the Aslib Chemical Group Conference, INFOCHEM '70s, University of Surrey, 31st March–2nd April 1971

A COST ANALYSIS programme is defined here as a project aimed at quantifying the balance of a working system by measuring the input in terms of resources allocated to the various parts of the programme and relating this to the output measured in terms of what has been accomplished. Cost analysis is primarily used when it is not possible to evaluate the benefits resulting from the programme.

Only occasionally is it possible to prove that an information service has created or contributed to the creation of real benefits, and then only with the help of users who are willing to assist in identifying and quantifying such benefits. Such a case is reported below.

At a meeting of industrial managers the accounts and cost distribution of a shipyard in Denmark were discussed. A question was raised about the total cost of internal transportation and materials handling. These costs were not known because the shipyard did not know how to identify or measure that kind of cost. A technical information officer present at the meeting was able to introduce the idea of frequency analysis techniques and arranged for two consultants to visit the manager of the shipyard.

The consultants carried out an analysis and proposed the establishment of a central service unit for transport and materials handling. This analysis was repeated one year after the establishment of the system in order to measure the extent of the improvement. The fee charged by the technical information service for the ignition process was £15. The investment in analysis, equipment and establishment of the transport system was £20,000 but the benefits gained by the shipyard were a saving running to more than £100,000 per year.

We have had a number of similar cases in our organization, not all reporting such spectacular benefits, but numerous enough to justify our belief in the economic advantages which industry can derive from a national technical information service.

Even though we may believe in the value of our work we might still be uncertain about how much to invest in an information service, especially when such units become more sophisticated in developing their techniques, creating their own science and demanding such complex and costly equipment as computers. A non-profit-making institute or unit has, just like a business enterprise, a need to carry out regularly an analysis of its activities; to analyse its market conditions, its commodities and services, as well as the development of its organization. It is a very useful exercise for the staff and it makes the discussion

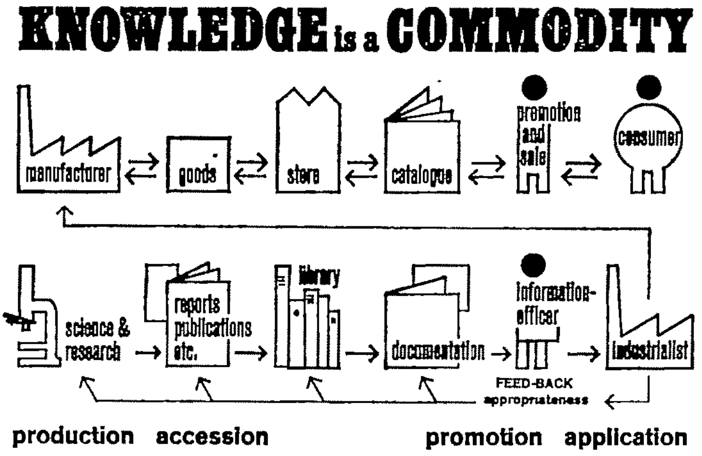

FIG. 1

with the board of directors and the sponsors more meaningful and professional.

I am invited, therefore, to speak about the cost analysis scheme of my own organization, Dansk Teknisk Oplysningstjeneste (Danish Technical Information Service). I thought it appropriate, even necessary, to include some general introductory remarks because it is my experience that a cost analysis scheme has no meaning unless we recognize that its main purpose is to evaluate our fundamental ideas of the business we are in and the policies which are behind our working programme.

DTO is a national service established in 1955, on the initiative of the Ministry for Commerce and Industry, to be part of the productivity programme for industry in Denmark. We are now operating as a private non-profit-making institute affiliated to the Danish Council of Scientific and Industrial Research and we rely on the Research Council, i.e. public money, for 85 per cent of our income. We are operating according to the third generation of our statutes, which means we have had two opportunities of making a fundamental business analysis, each time readjusting the programme conditions to the business environment in which we are working. What I am going to talk about is the current situation.

Our field of business is that of promoting the utilization by industry of the commodity named knowledge (Fig. 1). This means that we have to adopt the general principles of marketing technique, including:

1. Examination of the structure of the prospective market.
2. Diversification of demand.
3. Development and stimulation of demand.
4. Active presentation of assortments of 'commodities'.
5. Training in searching for and utilization of 'commodities' available.
6. Liaison between 'consumers', 'stores' and 'manufacturers'.
7. Reporting on the appropriateness of accessibility of 'commodities'.

We can analyse the market to show the geographical distribution of industry, or the distribution of manufacturing enterprises in terms of the number of people employed (Table 1), but none of these figures have any real bearing on our commodity.

TABLE 1: *Distribution of manufacturing enterprises by numbers employed*

No. of enterprises	*No. of persons employed*
5500	10–100
800	101–500
100	more than 500

What we really need to know is the distribution in industry of 'receiving sets' for our commodity, knowledge, as measured, for example, by the number of engineers in industry (Table 2).

TABLE 2: *Distribution of engineers among industrial enterprises*

No. of enterprises		*No. of engineers employed*
metropolitan area	provincial area	
1450	1705	1–3
290	240	4–10
90	70	11–20
25	25	21–50
15	5	more than 50

In these circumstances how can an information service promote better and more effective utilization of knowledge when the staff in the companies is so small that engineers cannot afford the time required for analysing and adapting, or even reading the material we can disseminate to them?

In Denmark there are a number of centres of specialized knowledge, e.g. the Technological Institutes in Copenhagen and Aarhus, R & D institutes which are part of the Academy for Technical Sciences and laboratories located at the technical universities, etc., who also employ technical staff (Table 3). How could we mobilize the potentials of these centres? The answer was to establish a personal contact and dialogue between the industrialist with a problem and the specialist with the most relevant and appropriate knowledge and experience.

TABLE 3: *Distribution of engineers among the specialized centres*

No. of centres		*No. of engineers employed*
metropolitan	provincial	
208	224	1–3
76	54	4–10
27	19	11–20
20	8	21–50
8	8	more than 50

The programme developed covered six major aspects, viz:

1. Field liaison service.
2. Active information and loan service.

3. Conference, course and training service.
4. Question and answer service.
5. Advisory service on setting up industrial information services.
6. Specialized information service

with the emphasis on DTO taking the initiative at all times.

The first step was to establish the field liaison service with the following aims:

1. Visiting firms uninvited.
2. Stimulating demand for knowledge by interviews.
3. Promoting sources of specialized knowledge available,

and obtaining feedback on the distribution of fields of interest and receptivity and on the appropriateness of the sources and services available. Then, having adapted ourselves to the client's environment and having obtained an understanding of his needs, the next step was to provide an intelligence service on behalf of the clients, evaluating and extracting from various sources of information those items which could stimulate his demand:

1. Searching information and evaluation according to the dynamic 'profile' of the individual firm.
2. Selective dissemination,

the feedback in this case being requests for information, documents and service.

This was accompanied by a programme of conferences and courses designed to motivate a group of industrialists into demanding more information, documentation, library service, consultation, research, etc.

All these services were provided without charge as a matter of policy.

If, as a result of this activity, we were successful in stimulating the interest of industry, we expected a demand for our services in identifying sources of information, providing special services, specialist assistance, special information, etc. This would be charged for, because at this stage we would be working as a supplement to, or extension of, the staff of the industrial organization.

To maintain and develop our experience and capability, supplementary programmes are necessary. We need an intimate knowledge of the domestic network of specialized information centres: we need to acquaint ourselves with the individual centres and their staffs in order to know which organizations and individuals are best qualified to assist industry. This programme of national collaboration also covers the service and assistance given to these centres to improve their own promotion to industry.

There is also an international collaboration programme which is both bilateral and multilateral. We are given the task of representing Denmark within the field of technical information in OECD, FID, UNIDO, etc. At present we operate the secretariat for the FID/II Study Committee on Information for Industry. We also act as the Danish Referral Centre within science and technology, as well as being the adviser to the Ministry of Foreign Affairs with regard to the group of scientific counsellors and attachés in Bonn, London, Paris, Washington and New York. We are the Danish representative on the Steering Committee of the Scandinavian Documentation Center in the USA.

I must apologize for this rather lengthy account of our policies and programmes but it is necessary to explain this background in some detail in order to show why we consider it necessary to undertake a cost analysis of the programme and how we can learn from the feedback obtained from this analysis.

The analysis of the field liaison service (Table 4) indicates the total number of visits paid during one fiscal year and the distribution among categories of units visited, plus an analysis of the geographical distribution of visits, and shows how we are covering the country in relation to the distribution of industry, and also the average cost of a visit.

TABLE 4

Costs		**Accomplishments**	
1. Field Liaison Service			
Salaries, engineers (3476¾ h)	Dkr. 161,365	455 visits to 403 diff. enterprises, i.e.	
Salaries, office staff (539½ h)	- 11,172	1 organisation	
Consultants	- 2,363	68 centres of specialized knowledge	
Transportation and car-fare	- 17,880	332 manufacturing companies	
Hotel and board allowances	- 7,365	2 public services	
Miscellaneous (promotion materials)	- 1,491	Geographical distribution of visits:	
	Dkr 201,627	District	Number
		North Jutland	12
		Middle Jutland	60
		South Jutland	37
		Funen	39
		Zealand (less Greater Copenhg.)	53
		Greater Copenhagen	148
Cost per visit: approx Dkr 443 Cost per enterprise: approx Dkr 500		Free of charge.	

The selective dissemination service is based upon an intimate knowledge of the industrial enterprises, obtained through our visits and by taking part in management training courses. The input to the system includes the scanning of a number of foreign sources of information, i.e. journals, reports, indexes and special materials bought or given to us by colleagues abroad (Table 5).

Whereas cuttings (abstracts, digests, summaries) and articles speak for themselves, it may be useful to say a little more about books and reports. We have a small library, one part of which contains reference books, directories, annual reports of research establishments (Danish and foreign); the other contains books and reports on individual topics within technology, research and development, industrial experience, economics, etc. The latter collection is highly selective and books are purchased only if they are relevant to a particular industry, have a bearing on the state of the art and its development, are written in language which will motivate industrialists to read them, have an attractive layout, and are of interest to at least seven companies or institutions. These books are circulated on our initiative to selected companies just to persuade them to buy the book for their own collection. Borrowers are expected to return the books within eight days.

As all users are registered by number in the files of DTO it is very easy to count the number of items of information of various kinds sent to the individual users within the different kinds of organization, and so obtain an analysis of the

TABLE 5

Costs		Accomplishments
2. Active Selective Information Service		**Cuttings:** 6606 to 987 diff. receivers, i.e. 27 organisations 203 centres of spec. knl. 504 mfg. companies 253 individuals
Salaries, engineers (2407¾ h)	Dkr. 116,747	**Articles:** 4603 to 1099 diff. receivers, i.e. 31 organisations 200 centres of spec. knl. 558 mfg companies 310 individuals
Salaries, office staff (7542¾ h)	- 132,385	**Lendings of books, reports etc.:** 2459 to 724 diff. receivers, i.e. 22 organisations 123 centres of spec. knl. 461 mfg companies 118 individuals
Consultants	- 16,003	
Information materials	- 29,779	
Postage	- 34,953	
	Dkr. 329,887	**Total:** 13668 to 1510 diff. receivers, i.e. 46 organisations 283 centres of spec. knl. 738 mfg companies approx. 440 individuals
Cost per unit: approx. Dkr. 24 Cost per receiver: approx. Dkr. 218		Free of charge. Reaction: DK/P and DK/L tasks.

total dissemination. The response from the users takes the form of orders for specific documents (Table 6). During the year 31.5 per cent have ordered reports and other publications for which they are charged the cost, plus a small fee of approximately 75p per order. The fee is kept as low as possible to ensure that they respond to DTO, even though we know that the normal policy of many companies is to purchase locally. When delivery time is important we know we will always receive the order because we can provide documents by airmail in one-fifth of the time taken by local libraries and bookshops. However, our

TABLE 6

Costs		Accomplishments
a) Requests for documentation (DK/P and DK/L tasks)		The reactions to 6606 cuttings + 2459 lendings have been: 537 diff. clients (31.5 %) have given 1401 orders comprising 2261 diff. reports, documents, publications etc.
Salaries, engineers (21½ h)	Dkr. 844	
Salaries, office staff (2120 h)	- 37,229	
Purchase of information materials and postage expenses	- 34,287	
Miscellaneous	- 1	Fees invoiced Dkr 23,775 Refunding of outlays Dkr. 40,721 Total Dkr 64,496
	Dkr. 72,361	
Cost per request: Dkr. 52		Turnover per order: Dkr. 46

policy is not to compete with the book trade in areas other than relevance of material and speed of provision.

The initiating work of DTO aims at stimulating industrialists to ask questions: to request information for solving problems, for development of products methods, processes, etc., or to be used for long-range planning (Table 7). About two thousand requests are answered by telephone, just from the files of DTO, but 213 tasks were of a more serious nature demanding some measurable time from one or other of DTO's engineers. The requests are analysed by type of inquirer and by the kind of task, just as the topic is registered so that it can be retrieved if necessary. The inquirers are charged a fee but, as you can see, one which is not, at present, high enough to balance the cost. We would like to achieve a balance because we want industry to appreciate the value of the answers, since such an appreciation will influence them in making more effective use of the material provided.

Each request is handled confidentially, mainly by consulting Danish and foreign information analysts or specialists and only to a small extent by the normal documentation service.

TABLE 7

Costs		Accomplishments
b) Requests for procurement of information (DK/S tasks)		
Salaries, engineers (2594 h)	Dkr. 118,333	213 tasks from 116 diff. inquirers, i.e.
Salaries, office staff (914¾ h)	- 15,994	3 organisations
Consultants	- 5,117	8 centres of spec. knl.
Information materials	- 5,127	104 mfg. companies
Transportation and car-fare	- 4,875	1 public service
Hotel and board allowances	- 1,295	
	Dkr. 150,741	213 tasks have been: 199 – procurement of information 14 – planning and management of courses and conferences
Cost per request Dkr. 708		Turnover per order. Dkr. 606
c) Requests by telephone		
Salaries, engineers (660 h)	Dkr. 31,602	Approx. 2000 requests.
Salaries, office staff (86¾ h)	- 1,524	
	Dkr 33,126	
Cost per request: approx. Dkr. 17		Free of charge.
d) Requests from foreign centres or from own organisation (DK/U and DK/AD tasks)		
Salaries, engineers (339½ h)	Dkr 15,826	74 tasks, i.e.
Salaries, office staff (101¾ h	- 1,834	58 foreign
Information materials	- 1,366	16 internal
Transportation and car-fare	- 353	
Hotel and board allowances	- 100	
	Dkr. 19,499	
Cost per task: approx Dkr. 264		Free of charge.

Table 8 analyses the programme of courses and conferences involving groups of users or prospective users and resulting in the establishment and operation of specialized information services geared to the needs of a branch of industry.

TABLE 8

Costs

Courses and Conferences

Salaries, engineers (100¼ h)	Dkr.	5,830
Salaries, office staff (279¼ h)	-	4,805
Consultants	-	3,300
Transportation and car-fare	-	1,447
Hotel and board allowances	-	11,039
Information materials, including visual aids, etc.	-	5,521
	Dkr.	31,942

Conference cost per day: Dkr. 7,986

Accomplishments

Conferences:

	Fee	Outlays
Group of architects	5,500	15,399
Ass. of factory inspectors	4,000	1,225
	9,500	16,624

Conference days: 4

Conference fee per day: Dkr. 6,531

Costs

Specialized Information Services

Salaries, engineers (773½ h)	Dkr.	33,900
Salaries, office staff (387¾ h)	-	6,672
Information materials	-	1,583
Transportation and car-fare	-	3,596
Hotel and board allowances	-	130
Postage etc.	-	160
Office materials	-	136
Outlays (membership fees)	-	3,677
	Dkr.	49,854

Accomplishments

Clients

Pump-manufacturing industry	Dkr.	40.000
Radiator-manufacturing industry	-	21,677
	Dkr.	61,677

Tasks given to the DTO by the Research Council consist of collaboration with domestic centres oriented to serve industry and also the furthering of international collaboration (Table 9). Maintaining and improving the qualifications

TABLE 9

Costs

6. Collaboration with Domestic Centres

Salaries, engineers (2048¼ h)	Dkr.	109,450
Salaries, office staff (511 h)	-	9,045
Consultants	-	788
Transportation and car-fare	-	2,708
Hotel and board allowances	-	734
Membership fees	-	1,388
Information materials	-	492
Miscellaneous	-	25
	Dkr.	124,630

Accomplishments

Collaboration with departments of Universities, the Academy of Technical Sciences, Engineers' Associations, organisations of trade, public authorities, etc.

Costs

7 International Collaboration

a) Support of SCANDOC (USA)	Dkr	45,903
b) Membership of foreign learned societies	Dkr.	8,933
c) Participation in International organisation:		
Salaries, engineers (619¾ h)	-	35,786
Salaries, office staff (279¼ h)	-	4,972
Transportation and car-fare	-	7,720
Hotel and board allowances	-	4,335
Miscellaneous	-	460
	Dkr	62,206

Accomplishments

Nordforsk, SCANDOC, OECD, ETC, FID, FID/II, ASLIB, AID, National Industrial Conference Board, American Management Association, British Institute of Management, International University Contact, etc

TABLE 10

Costs			Accomplishments
8. Study Tours and Post-Graduate Training			
Salaries, engineers ($2377\frac{3}{4} + 333\frac{3}{4}$ h)	Dkr.	110,191	**Study Tours** for 3 engineers.
Salaries, office staff ($198\frac{1}{2}$ h)	-	2,591	
Conference and course fees	-	14,416	**Post-Graduate Training** of 6 engineers.
Transportation and car-fare	-	3,722	
Hotel and board allowances	-	3,223	
	Dkr.	134,143	
Study Tours:	Dkr.	20,585	
Post-Graduate Training:	Dkr.	113,558	
9. Planning and Administration of Own Organisation			
Salaries, engineers ($2421\frac{3}{4}$ h)	Dkr.	131,275	Regular meetings and communication of staff and board of directors, internal committee meetings.
Salaries, office staff ($6534\frac{3}{4}$ h)	-	113,958	
Transportation and car-fare	-	7,218	
Miscellaneous	-	229	
	Dkr.	252,680	Bookkeeping, secretariat, reception desk, telephone exchange.

of the DTO staff account for about 7 per cent of the total budget, while about 12 per cent is allocated to planning and administration (Table 10). The general expenses of DTO, i.e. those expenses which cannot be allocated to any specific part of the working programme, amount to about 27 per cent (Table 11). Less than 2 per cent of the engineers' working time and less than 1.5 per cent of the working hours of the office staff are unspecified.

TABLE 11

Costs

10. General Expenses		
Salaries, engineers ($638\frac{1}{2}$ h)	Dkr.	29,114
Salaries, office staff ($362\frac{1}{4}$ h)	-	6,378
Consultants (PR, visual aids, etc.)	-	4,818
Sick-days, engineers ($1478\frac{1}{2}$ h)	-	71,724
Sick-days, office staff (1686 h)	-	29,837
Holidays, engineers ($1330\frac{1}{2}$ h)	-	63,946
Holidays, office staff (1632 h)	-	28,500
Brochures, business forms, printed materials	-	15,501
Handbooks, directories, etc.	-	32,921
Office materials	-	42,995
Office equipment	-	15,755
Telephone, cables, postage	-	22,099
Entertainment	-	2,528
Office premises, rent, etc.	-	151,673
Canteen expenses	-	15,298
Substitute office assistance	-	5,304
Miscellaneous	-	5,701
	Dkr	543,892

Total costs: Dkr. 2,052,471

Accomplishments

Engineers		
Total of hours applied		$21,814\frac{3}{4}$ h
less sick-days	6.8%	$1,478\frac{1}{2}$ -
less holidays	9.1%	1,544 -
less consultants	1.6%	354 -
less over-time	7.3%	$1,592\frac{1}{2}$ -
Standard working hours		$16,845\frac{3}{4}$ h
Office Staff		
Total of hours applied		24,294 h
less sick-days	6.9%	1,686 -
less holidays	9.7%	$1,875\frac{1}{2}$ -
less canteen	3.3%	796 -
less substitutes	1.4%	332 -
less over-time	0.7%	$169\frac{1}{2}$ -
Standard working hours		19,435 h

Let me try to anticipate some of the questions you may wish to ask about the procedures we use to collect and evaluate the data necessary for the cost analysis, beginning with the analysis of working hours and the conversion of this into monetary terms. We use a weekly time sheet on which the staff record the amount of time spent each day on various tasks relating to the working programme, with a precision limit below half an hour. The sheets are collected each Monday and a weekly summary is made to the technical and office staff, from which a quarterly summary is compiled for each member of the staff. Using a standard salary per hour the salary expenses allocated to the various parts of the working programme can be calculated.

The standard salary per hour is defined as the total expenses for each person for salary, pension, insurance, etc., divided by the number of effective working hours, i.e. not counting vacations, weekends, national holidays, etc. Overtime is registered, not paid, but counted in the analysis. On the back of the time sheet, notes are made of important contacts made during the week and important cases dealt with.

The statistics on jobs accomplished are compiled on a weekly basis and every quarter a cost analysis sheet is produced. This continuing programme is so well managed by the staff that I normally receive the quarterly cost analysis within ten days after the end of the quarter.

What benefit do we derive from this quarterly cost analysis? In the first place we have given the staff a means by which they can identify their own contributions to the performance of the unit. Further, we have made them cost minded, which is indeed very necessary in a non-profit-making organization supported by the taxpayer's money. We are able to discuss our working programme and policy with the staff on the basis of facts contributed by themselves, and discussions with the board of directors can be conducted on the level of policy issues, not on detailed expenditure. As an extra benefit, we found that the public auditor stopped criticizing our somewhat untraditional working methods because he can see exactly how the money is spent and the use to which it is put. For the same reason the Research Council can have confidence in the DTO, so that the decision to continue its support, now running at two million Danish kroner per annum, can be taken purely on policy grounds.

SURVEYS OF RECORDS IN THE BRITISH ISLES*

DAVID ALLEN

Social Science Research Council

IN THE LAST year or two the number of *ad hoc* record-listing projects in this country has increased quite dramatically. After a long period during which any such initiatives were few and far between, the regular, long-term work of the major libraries and of the various central and local government record-holding or -listing institutions is now being massively supplemented by a network of non-official efforts, already numerous enough to amount to a distinct para-activity of their own.

Basically, there are two reasons for this change. First, the enormous expansion recently in the number of university research workers (many of them concerned with fields in which there has hitherto been little interest) has coincided with a no less enormous expansion in the quantity of records within the British Isles being made available for study. As a result, inevitably, there has built up a very heavy 'pressure of demand' on the part of the scholarly community. The existing institutions, denied increases in their resources that are in any way commensurate, so far from being able to respond to the calls for additional, more specialized aids to research, have in many cases fallen far behind with the work that they properly regard as their staple. On top of this general clogging of the raw material supply-lines, the emergence of so many new research areas with a substantial and growing following among professional scholars has led to a heightened awareness of the lack of comprehensive, cross-institutional guides to the collections that are already known to exist. In short, before many of these fields of study can hope to make much progress in this country, some elementary signposting of the sources on which they must depend has come to appear as a *sine qua non*.

The second factor has been the arrival on the scene in this country of a national body disposing of sizeable grant funds with an active interest, for the very first time, in supporting certain types of research based on the study of unpublished records. This is the Government-sponsored Social Science Research Council, one of the new research councils created in 1965 out of the dismemberment of the Department of Scientific and Industrial Research. The SSRC's impact effectively dates from two years after its founding, when its research grant funds first achieved respectable dimensions. The decision was taken to provide support for the provision of research facilities (and not just for research projects in the strict sense) and its representation of the social sciences was extended to economic and social history. For the historian, it might be said, the record-listing project is the equivalent of the sample survey or the econometric model: it is typical of the fairly large, collective undertaking that presents itself as an obvious candidate for support in any programme of large-scale funding. It is no surprise, therefore, that a comparatively high proportion of the research grants awarded by the Council in (more especially) the field of economic and social history have been for projects involving the location and listing of some particular section or other of the country's records.

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* This article will also be published in the October 1971 issue of *Archives*.

So numerous and varied are the efforts of this kind now under way that there is a growing risk of wasteful duplication. In the hope of preventing this—and to facilitate the pinpointing of areas as yet uncatered for—the list below has been compiled of all such projects, whether supported by the Council or not, that have so far come to light. To enhance its usefulness, a number known to have been completed within the last five years or so have also been included. On the other hand, projects concerned primarily with the *collecting* of records—such as the Oxford Colonial Records Project and that of the Centre of South Asian Studies at Cambridge, both supported by the Nuffield Foundation—have deliberately been omitted.

The list is confined to a brief description of the class of records being listed (in many cases, before this can be done, they are first having to be located); the agency (A) through whom the actual direction of the project is being mounted (not always easily distinguished from the overall sponsor), together with, as far as possible, the name of the person(s) responsible for the day-to-day operations; any external body or bodies providing financial support (S); and finally, any publication directly resulting from the work in question (P). For fuller details—such as how far calendaring is being attempted—reference should be made to the individual project directors themselves.

Business

(a) *General*

Business records and estate papers in north-east Scotland.
A: Department of Economic History, University of Aberdeen (Professor P. L. Payne).
S: Social Science Research Council.

Records in UK belonging to British firms with business in the Middle East, 1800–1965 (pilot project).
A: Middle East Centre, St Antony's College, Oxford (Dr E. R. J. Owen).
S: Social Science Research Council.

Records in UK and South America of British firms conducting business in or with Latin America, 1810–1914.
A: Faculty of History, University of Cambridge (Dr D. C. M. Platt).
S: Social Science Research Council.

(b) *Aircraft industry*

Records of UK airframe and major aircraft component manufacturers.
A: Royal Air Force Museum (Mr D. C. Brech).

(c) *Banking*

Records of banking in England, Wales and Northern Ireland.
A: Business Archives Council (Dr L. S. Pressnell).
S: Donations from British banks.

Records of banking in Scotland since 1695.
A: Department of Economic History, University of Glasgow (Professor S. G. Checkland).
S: Institute of Bankers in Scotland.

(d) *Insurance*

Records of the UK insurance industry.
A: Business Archives Council.
S: British Insurance Association.

(e) *Shipping*

Records of British shipping in regional, local and private repositories in Great Britain.
A: Business Archives Council and National Maritime Museum (Mr A. W. H. Pearsall).

Economics

Collections of economic statistics.
A: Library Association and Royal Statistical Society (Mr P. R. Lewis).
S: Office for Scientific and Technical Information.
P: *Economic Statistics Collections: A Directory of Research Resources in the United Kingdom for Business, Industry and Public Affairs* (Library Association, 1970).

Papers of British economists mainly since 1750.
A: Department of Economics, Queen's University, Belfast (Mr R. P. Sturges, c/o Institute of Historical Research, University of London).
S: Royal Economic Society; Social Science Research Council.

Engineering

Records of the UK agricultural engineering industry.
A: Institute of Agricultural History, University of Reading (Dr E. J. T. Collins).
S: Social Science Research Council.

Government and Politics

Papers of all persons and institutions active in British politics, 1901–51.

(i) Pilot project (1968–70): Cabinet Ministers.
A: Nuffield College, Oxford (Mr G. C. L. Hazelhurst).
S: Social Science Research Council.

(ii) Main project (1970–5).
A: British Library of Political and Economic Science (Mr C. P. Cook).
S: Social Science Research Council.

Non-confidential, mainly unpublished, material in Government Departments of potential interest to social science researchers.
A: British Library of Political and Economic Science (Mr A. F. Comfort).
S: Social Science Research Council.

Records of the Political and Secret Departments in the India Office Records, 1750–1947.
A: School of Librarianship and Archives, University College, London (Mr M. I. Moir).

Certain classes of material of interest to social scientists in the newly-opened records (1920–39) in the Public Record Office.
A: Department of Economic and Social History, University of Kent (Dr Brenda Swann and Miss M. P. Turnbull, c/o Public Record Office).
S: Social Science Research Council.

Irish government Papers, 1921–70.
A: School of Library and Information Studies, Queen's University, Belfast (Mr A. Maltby).
S: Social Science Research Council; British Academy.

Records of trade unions, co-operative societies and working class political movements in Scotland.
A: Department of Economic History, University of Strathclyde (Mr I. MacDougall).
S: Social Science Research Council; Scottish Trades Union Congress.

P: *Interim Bibliography of the Scottish Working Class Movement and of other Labour Records held in Scotland* (Scottish Labour History Society, Edinburgh, 1965).

Private papers relating to British policy in the Middle East, 1800–1965.
A: Middle East Centre, St Antony's College Oxford (Mr A. H. Hourani).

Military History

British military, naval and air records of the twentieth century.
A: Imperial War Museum (Mr D. G. Lance).

Papers of the late Sir Basil Liddell Hart.
A: King's College, London (Sir John Hackett).
S: Social Science Research Council.

Religion

Records of British missionary societies.
A: Group on Records, Libraries and Information Services of the Conference of British Missionary Societies (Miss Rosemary Keen).
S: Historical Manuscripts Commission.
P: *A Guide to the Archives of Selected Missionary Societies* (mimeographed: Historical Manuscripts Commission, 1969).

Science

Letters, personal papers and unpublished monographs of approximately 1,200 British scientists who flourished between 1800 and 1914.
A: Science Policy Research Unit, University of Sussex (Dr R. M. MacLeod).
S: Social Science Research Council; Royal Society.

Personal papers of about 250 historically important figures in British science and technology (chiefly Fellows of the Royal Society) from the 16th century to the time of Lord Rutherford.
A: Standing Joint Committee of Royal Society and Historical Manuscripts Commission (Dr R. E. W. Maddison). Office at Royal Astronomical Society.
S: Goldsmiths' Company.

Personal papers of recently-deceased Fellows of the Royal Society.*
A: Standing Joint Committee of Royal Society and Historical Manuscripts Commission.
(i) Pilot project (Miss J. M. Pye): papers of Sir John Gaddum, Sir Francis Simon and Professor Wager.
S: Historical Manuscripts Commission.
(ii) Main project.
S. British Records Association.

Unpublished papers and correspondence of Fellows of the Royal Society of Edinburgh, 1783–1883.
A. Department of History, University of Edinburgh (Dr E. G. Forbes).

Papers of John Tyndall (at Royal Institution).
A: Science Policy Research Unit, University of Sussex (Dr R. M. MacLeod).
S: American Council of Learned Societies.

Papers of Karl Pearson (at University College London).
A: University College London (Dr Maxine P. M. Merrington).
S: Social Science Research Council.

* See also proceedings of an Aslib meeting on this subject: KURTI, N., GOWING, M. M., PYE, J. M. and ELLIS, R. H. 'The archives of twentieth-century scientists and technologists', *Aslib Proceedings*, **23**, 3, March 1971, p. 118–32.

Social History
Unpublished materials relating to the South Wales Coalfield.
A: University College of Swansea (Professor W. A. Cole and Professor G. Williams).
S: Social Science Research Council.

Social Science
Data from sample surveys carried out by government, academic bodies or commercial firms potentially available for deposit in a national survey data bank.
A: Political and Economic Planning on behalf of the Social and Economic Archive Committee (Miss J. Steward).
S. Social Science Research Council.
P: *National register of surveys* (PEP, 1967, privately circulated).

* * * *

In addition, there have been a number of surveys of all the records held within the British Isles relating to certain countries or areas overseas. As these, by their very nature, cut across the various subject areas, they are necessarily listed separately:

Africa (all countries)
S: School of Oriental and African Studies, University of London (Miss M. D. Wainwright and Miss N. Matthews).
S: Rockefeller Foundation.

Australia, New Zealand and the Pacific Islands
A: Australian National University and National Library of Australia (Miss P. Mander Jones). UK office at Institute of Commonwealth Studies, University of London.
S: Australian National University; National Library of Australia.

Germany
German history and Anglo-German relations (only).
A: The Anglo-German Group of Historians (Dr W. Lenz, c/o Institute of Historical Research, University of London).
S: Volkswagen Foundation.

Italy
A: Centre for the Advanced Study of Italian Society, Department of Italian, University of Reading (Dr S. J. Woolf), on behalf of the Repertory of Italian Historical Writings, University of Turin.
S: Italian National Council of Research.

Latin America and the West Indies*
A: International Council on Archives (Mr P. Walne, c/o County Record Office, Hertford).
S: International Council on Archives on behalf of Unesco.
P: *A Guide to Manuscripts relating to the History of Latin America and the West Indies* (OUP, in the press).

Near and Middle East†
A: School of Oriental and African Studies, University of London (Miss M. D. Wainwright and Miss N. Matthews).

* See also under 'Business'.
† See also under 'Business' and 'Government and Politics'.

Far East

A: School of Oriental and African Studies, University of London (Miss M. D. Wainwright and Miss N. Matthews).

Southern Asia (Afghanistan and Tibet to Indo-China, the Philippines and Indonesia)

A: School of Oriental and African Studies, University of London (Miss M. D. Wainwright and Miss N. Matthews).
S: Rockefeller Foundation.
P: *A Guide to Manuscripts and Documents in the British Isles relating to South-East Asia* (OUP, 1965).

Letter to the Editor

Dear Sir,

THE FOREIGN-LANGUAGE BARRIER

Dr Urquhart's suggestion that a wider range of foreign languages should be taught in schools should not be dismissed so summarily as it is by Mr Line in your April 1971 issue (p. 207). To take Mr Line's points one by one:

(1) If a start can be made with the teachers we have, no matter how few, then the number of teachers available will surely increase with the years, i.e. as students qualify.
(2) Some pupils studying science may be prepared to choose languages such as Russian or Japanese provided the probable advantages of having a knowledge of such languages are made clear.
(3) This statement seems to imply a gap in language learning activities between school and adult life; such a gap should not exist.
(4) The motivation will be the ability to make use of an article without having to wait for a full translation, which can take a considerable time.
(5) This probability depends on the number of students taught but, like the number of teachers, it should increase with the years.

The benefits resulting from scientists having a knowledge of languages other than French or German would be:

(a) Scientists could make use of articles of passing interest (i.e. those which although helpful are not worth producing as a published translation) without calling on translating staff, and
(b) they could judge better which articles are worth translating fully and making generally available.
(c) The contribution to technical translation activities which scientists with some linguistic knowledge could make would be a valuable complement to that being made by linguists, many of whom have to pick up the necessary scientific or technical knowledge as they go along—not always with the happiest of results.

Yours faithfully,

P. J. ELVIN

Building Research Station,
Garston,
Watford, WD2 7JR.
26th May 1971

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

Items are available in the Aslib Library and may be borrowed unless marked to indicate reference copies.*

User Studies

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RRL's efforts to meet the information needs of the road designer and builder.
In
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Materials information, 1970, p. 68–79.

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Inzicht in literatuurgebruik als steun voor bibliotheekbeleid.
Open, vol.3, no.4, April 1971, p.231–4.
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HEBERGER, K. *and* BALAZS, J.
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UNISIST: synopsis of the feasibility study on a world science information system. Paris: UNESCO, 1971.
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Scholarly Publishing, January 1971, p.203–7, UNISIST.

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Chemical Engineering, 25th January 1971, p.77–87.
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IEEE Student Journal, vol.8, no.5, November 1970, p.39–41.

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Selected R & D requirements in the computer and information sciences.
Proceedings of the AFIPS Fall Joint Computer Conference, vol. 37, 1970, p. 159–68.

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172p.

*NELSON, CARNOT E., *and* POLLOCK, DONALD K., *ed.*
Communication among scientists and engineers. Lexington, Mass: D.C. Heath & Co., Heath Lexington Books, 1970.
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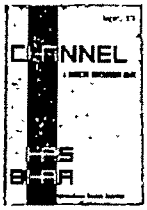

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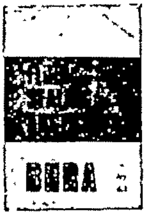

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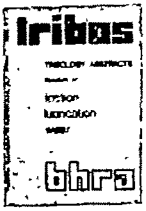

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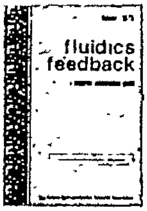

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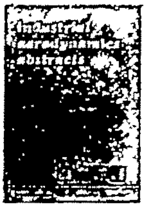

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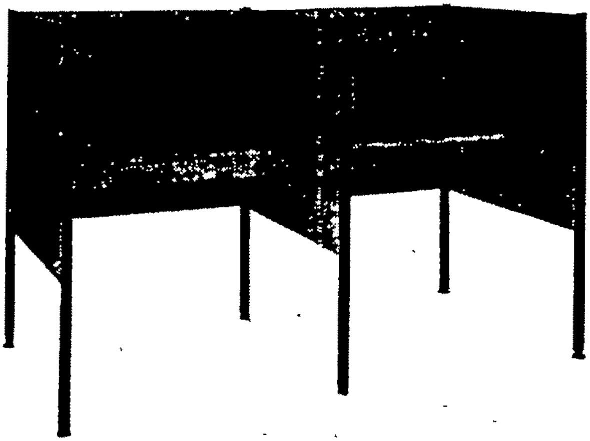

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ASLIB PROCEEDINGS

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Volume 23 August 1971 Number 8

ASLIB CALENDAR 1971

September

TUE.14.	Chemical Group evening meeting. 'Patents as a source of technical information', by Miss K. M. Saunderson (ICI, Plastics Division). Aslib. 5 p.m.
WED.15.	Computer/Data Processing Group one-day Working Party Seminar. Heythrop College, 12 Cavendish Square, W1.

October

FRI.1.	Technical Translation Group meeting and Translation Workshop Aslib. 3 p.m.
MON.4.	Co-ordinate Indexing Group meeting. Aslib. 3.45 p.m.
TUE.5.	Audio Visual Group one-day Workshop: 'Slides'. Aslib.
SUN.10–THU.14.	Aslib 45th Annual Conference. Darmstadt, W. Germany.
MON.18.	Social Sciences Group evening meeting: 'Translations of social sciences material', by Professor W. Saunders (Sheffield University). Imperial College, SW7. 5 for 5.30 p.m.
WED.20.	Aslib Evening Meeting. 'Ergonomics and libraries', by J. G. Fox (University of Birmingham). Royal Institution of Naval Architects 10 Upper Belgrave Street, SW1. 5 for 5.30 p.m.
WED.27.	Transport and Planning Group/LA Reference, Special and Information Section one-day Conference. Library Association, 7 Ridgmount Street, W1.
FRI.29.	Technical Translation Group meeting. Aslib. 3 p.m.

November

TUE.16.	Chemical Group evening meeting: 'Why toxicity testing?', by B. J. Simpson (Shell Research Ltd).
THU.18.	One-Day Seminar: 'Computers and the librarian'. Connaught Rooms, Great Queen Street, WC2.
FRI.19.	Technical Translation Group meeting and sherry party. Aslib. 4 p.m.
WED.24.	Aslib Evening Meeting. 'Administering diffuse collections', by W. Ashworth (Polytechnic of Central London). Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1. 5 for 5.30 p.m.

December

MON.13.	Social Sciences Group evening meeting: 'The SSRC project,' by J. E. Pemberton (Warwick University). Aslib. 5 p.m.
WED.15.	Aslib Christmas Party. Aslib. 5.30 p.m.

of Bath, on Saturday and Sunday, 4th–5th March 1972. The Conference will be in three sessions: Reference services; Lending services; and Bibliographic services. Each session will have two or three speakers. The cost of the Conference will be in the order of £7.50 per person.

The present services, as offered by the British Museum Library, the NCL and NLL, and BNB, will be reviewed, and ways in which services should develop in the future will be considered. Attendance will be limited to 72. Further details will be issued later in the year.

Computers/Data Processing Group working parties and seminar

To meet the interests of its members in particular problem areas of computer information, the Steering Committee of the Computers/Data Processing Group are arranging a one-day seminar in London on Wednesday, 15th September 1971, at which it is hoped to set up working parties to examine the following subjects:

(a) Subject approach: thesauri and classification schemes.
(b) Library aids: union lists, special indexes (e.g. program names or book reviews), guides to sources of information, etc.
(c) Information transfer: various areas which help to make this easier, e.g. indexes to trade literature, provision of abstracts and keywords in journals, etc.
(d) Bibliometrics: statistical data on the behaviour of computer information, e.g. overlap of abstracting journals.
(e) Education: the needs of various groups within computing for education in computer information.
(f) Economic statistics: problems of statistics about computers, e.g. personnel, numbers of installations in various countries, marketing information.
(g) User needs and behaviour: a standard user survey.

The function of the working parties will be to examine and report on the present situation in their various fields and to recommend and implement such action as is required. The establishment of such working parties will, of course, depend on the level of support from the Group. Further suggestions for subjects for studies would be welcome.

The seminar on 15 September, which will be held at Heythrop College, 12 Cavendish Square, London W1, will give members a general picture of the problems of all the working parties and enable them to start examining in depth the particular problem in which they are interested. General enquiries on working parties should be addressed to Alan Pritchard, NCC Ltd, Quay House, Quay Street, Manchester M3 3HU. To attend the seminar (for which a charge of £5 to include coffee, lunch and tea will be made) apply to Miss G. A. Dodd, Computer Analysts and Programmers Ltd, 14/15 Great James Street, London WC1N 3DY. Those attending will receive a detailed programme at a later date.

InfoFair 2

Following the success of the first InfoFair exhibition, held in December 1969 and sponsored by the Ministry of Technology and the Thomson Organization, a second, larger exhibition is currently being organized, to be held at the Imperial College of Science and Technology on 4th–6th January 1972.

'InfoFair 2' is being planned and directed by a committee representing a number of organizations concerned with information technology, including Aslib. As with the first InfoFair, there will be two principal events: a conference which has the provisional title of 'Information for profitable management'; and the exhibition itself, which is open to all companies involved in the information industry. In 1969, over 500 delegates were present at the conference, which is directed at senior management in industry, commerce and Government, and over 3000 visitors attended the three-day exhibition, at which forty companies were represented.

Extensive publicity will be given to the event in the trade, business and national press. Further details on participation and costs, and an application form, are available from: The Organizers, InfoFair 2, Brintex Exhibitions Ltd, 3 Clements Inn, London WC2.

IFLA secretariat for cataloguing activities

The Council on Library Resources (CLR), Washington DC, has awarded a grant of $54,000 over a period of three years to the International Federation of Library Associations (IFLA) for the establishment and support of a permanent secretariat for the IFLA Committee on Cataloguing. The secretariat will initially be located at the Department of Printed Books in the British Museum. This grant is in addition to one of $100,000 made earlier this year by the CLR to enable IFLA to strengthen its administrative and staff operations and thus assume a more significant international role.

The new permanent secretariat will serve as the centre for the international co-ordination and standardization of cataloguing rules and practices. In addition, the secretariat will collect and disseminate pertinent information; provide services to working groups and individuals engaged in particular cataloguing projects; promote projects relating to the international standardization of cataloguing and bibliographical practices; undertake editorial and publishing activities; and produce a regular information bulletin.

General policy for the secretariat will be under the direction of a steering committee chaired by Mr A. H. Chaplin, chairman of the IFLA Committee on Cataloguing. Mrs Dorothy Anderson, Secretary of the same IFLA Committee, will have executive responsibility for the secretariat. Further information is available from Mrs Anderson, c/o The Department of Printed Books, British Museum, London WC1B 3DG.

Conference on clear print and the visually handicapped

The Library Association and the National Association for the Education of the Partially Sighted, are to hold a one-day conference on clear print, with special reference to the needs of the visually handicapped reader, on Wednesday, 20th October 1971, at the Commonwealth Hall, Royal Commonwealth Society, London WC2.

The speakers will be Mr Peter Jay, the lighting consultant on special lighting for visual defects; Mr Peter Banting, Department of Architecture and Civic

Design, Greater London Council, on designing schools for the partially sighted and Mr William R. Maidment, Borough Librarian, London Borough of Camden, on library provision for the visually handicapped reader. A panel discussion on the subject of 'the menace of small print' will form the second session of the conference. Mr Ronald Sturt, College of Librarianship, Wales, will put the case for the readers; Mr Hans Schmoller, Penguin Books, will put the case for using small print in books; Mr John Westwood, Graphic Design Department, HMSO, will speak on the subject of designing government forms, and Mr Harold Evans, the Editor of the *Sunday Times*, will discuss newspaper typography. The Chairman for this session will be Mr Alfred Morris, M.P., who successfully piloted the Chronically Sick and Disabled Persons Bill through the House of Commons.

The inclusive cost is £5.00, to include morning coffee, a buffet lunch and afternoon tea. For further information, contact The Research Officer, The Library Association, 7 Ridgmount Street, London WC1E 7AE.

Survey of national manpower requirements in modern languages

The Nuffield Foundation has awarded a grant of £15,150 to the University of York's Language Teaching Centre to carry out a survey, over a period of eighteen months, of the national language needs in employment. The purpose of the survey is to obtain from a wide range of employers, in both the private and public sectors of industry, information about which languages and which particular skills within those languages are required at all levels of employment.

The methods of enquiry will include a questionnaire addressed to employers and to individuals currently making use of language skills in employment, as well as a questionnaire addressed to a cross-section of graduates in modern languages. The survey team is working in consultation with similar enquiries at the University of Nancy, France, and the College of Education in Malmö, Sweden.

Further information about the survey is obtainable from: Mr K. A. Emmans, Language Teaching Centre, University of York, The King's Manor, York YO1 2EP.

Course on statistical collections

The Library Association, the Royal Statistical Society and the Department of Librarianship and Information Science at the Leeds Polytechnic are organizing a two-day residential study course for librarians and information officers on 'The nature, use and organization of statistical collections', to be held at the Langham Hotel, Harrogate, from 3rd to 5th November 1971. Full particulars are available from: M. Yelland, Research Officer, Library Association, 7 Ridgmount Street, London WC1E 7AE.

OSTI awards

Among recent recipients of grants awarded by the Office for Scientific and Technical Information are the following Schools of Librarianship:

(1) *The School of Library, Archive and Information Studies, University College, London*, for a two-year project study of the Bradford-Zipf 'law of scatter', under

the direction of Mr B. C. Brookes, Reader in the School. Mr Brookes is well known for his work on the Bradford-Zipf law, which describes the distribution of articles on a subject between journals in which they occur. A number of articles on this subject have appeared in the *Journal of Documentation.*

(2) *The Sheffield University Postgraduate School of Librarianship and Information Science* for the preliminary stage of a major investigation into the types, levels and qualifications of staff required for all aspects of library and information work. In the preliminary nine-month study the project team will visit libraries, information units and other organizations to arrange participation in later studies, which will be conducted by interview, observation and analysis. Those interested in the project should contact Professor W. L. Saunders at the School, Western Bank, Sheffield S10 2TN.

(3) *The Polytechnic of North London School of Librarianship* to develop and evaluate, over eighteen months, techniques of programmed instruction in practical subject indexing for librarians and information workers. The grant will enable a teacher of the subject to prepare a programmed course and evaluate it against conventional teaching methods. It is hoped that the project will demonstrate the advantages of programmed learning both in efficiency and economy and will indicate the feasibility of its application to other areas of information science.

34th Annual Meeting of ASIS

The 34th Annual Meeting of the American Society for Information Science will be held on 7th–11th November 1971 at the Denver Hilton Hotel, Denver, Colorado. The theme of the conference will be 'Communication for decision-makers'.

The principal speaker will be Dr C. Walter Stone, Chairman of J–MARC, Inc. (Joint Management and Research Consultants) who will address the delegates on the topic 'A managerial view of information science'. The Technical Program Chairman is Mrs Rowena Swanson (Graduate School of Librarianship, University of Denver) who has prepared a varied programme, including three 'invited-paper' sessions covering the topics, 'Specialized data and information bases and services', 'Co-operative programs, problems and progress', and 'Information science *vis-à-vis* library school curricula'. A number of subject sessions have also been arranged at which some fifty papers will be presented. General Chairman of the conference is Jack M. McCormick (Chief, Special Management Services, National Oceanic & Atmospheric Administration).

The 35th Meeting of ASIS will have as its theme, 'A world of information' and will focus on international co-operation in the information field. It will be held in Washington, DC, on 23rd–26th October 1972.

Further information about these Meetings may be obtained from: ASIS, 1140 Connecticut Avenue, NW, Suite 804, Washington, DC, 20036.

Chemical Abstracts indexes now computer-readable

The American Chemical Society's Chemical Abstracts Service introduced in June this year a new information service which now makes it possible to search the semi-annual subject and formula indexes to *Chemical Abstracts* by computer.

Called the *CA* Integrated Subject File, the new computer-readable service will contain the complete subject index entries for each volume (6 months) of *CA* plus the molecular formula for each chemical compound indexed. Each entry for a chemical substance will also include the computer-assigned Registry Number that identifies the substance in the CAS Chemical Registry System.

A search of the Integrated Subject File tapes alone will yield the identifying numbers of *CA* abstracts of papers or patents containing information on the subjects or substances specified in the search. The same abstract numbers appear in CAS's computer-readable *CA* Condensates service, which also includes the authors' names, titles, and complete bibliographic information for the corresponding papers and patents. By combining the two files, it will be possible to obtain search results in the form of complete citations of primary source documents.

Integrated Subject File tapes for volume 71 were made available in June and CAS expects to issue tapes for volumes 72 and 73 by the end of the year. CAS is also converting the information in the *CA* subject indexes of earlier volumes (back to January 1967) and ISF tapes will then be made available covering these volumes.

For further information, contact the marketing department, Chemical Abstracts Service, University Post Office, Columbus, Ohio 43210.

Latest edition of UDC

The latest section of the English Full Edition of the Universal Decimal Classification to be published by the British Standards Institution is BS 1000 (331) *Labour*. It covers industrial and labour relations, salaries, wages and fees, employment, labour market, working conditions, training and trade unions. An alphabetical subject index is included. Copies are available at £1.20 (£1.00 to subscribers) from BSI Sales Branch, 101 Pentonville Road, London N1 9ND.

Hilda S. Lindstedt, 1881–1971

Miss Hilda Lindstedt, the distinguished Swedish Librarian, died recently at the age of 89. She was for a number of years Librarian of the Kungl. Tekniska Hogskolans Bibliotek in Stockholm. She was also very active in the work of FID and was for some time editor of the *Revue de la Documentation*. Her contribution to the activities of FID was recognized in 1950 when she was elected an Honorary Member of the Federation. She continued to retain her interest in FID activities for many years after.

Aquatic Sciences and Fisheries Abstracts: correction

Our attention has been drawn to an error in the above item which appeared in the June 1971 issue (p. 272). The final sentence in this item should read: 'Further information is obtainable from A. G. Woolcott or T. R. Otley at Information Retrieval Ltd, 38 Chancery Lane, London WC2A 1EL (01-405 1305).'

BRIEF REVIEWS

EUROPEAN LAW LIBRARIES GUIDE. Prepared by the International Association of Law Libraries, under the auspices of the Council of Europe. London: Morgan-Grampian, 1971. 678 pp. £10.00. (SBN 900865 75X)

The directory contains details on the collections, organization and services in 522 libraries in eighteen countries of Europe. The complete text is in English with French translation for libraries in French-speaking countries. All types of libraries having substantial legal collections are covered, including national, government, court, professional and academic libraries. An indication is given of main subjects and national laws contained in the collections. Information provided includes normal directory information, size and growth of collection and library, number of staff, catalogues, etc. The subject index is in two separate sequences—English and French, with a complete alphabetical list of institutions and index of titles and terms.

The information is based on replies to a questionnaire sent out, and can be considered up to date as at 31st December 1969.

GARDE, P. K. The United Nations family of libraries. London: Asia Publishing House, 1970. 252 pp. £2.00. (ISBN 0 210 222 824)

This substantial study, especially of the UN libraries in New York and Geneva, is an expanded revision of the 1966 Sarada Ranganathan Endowment Lectures. The author, who is Chief of the General Reference Section of the Dag Hammarskjold Library in New York, provides a very useful account of the background and history of the UN in relation to its library policy. Under the chapter on the Geneva Library, the beginnings of the League of Nations Library, established in 1920, are described as part of the evaluation of the first truly international library system. It also contains what is probably the most detailed account of the libraries of the three Regional Economic Commissions of the UN.

On the other hand, the library structures of the fourteen members of the UN family are dealt with in very summary fashion. In this sense the title is perhaps a little misleading. An exhaustive bibliography of key documents and references and a good index add to the value of this book as an essential text on the UN library.

NATIONAL COMPUTING CENTRE LTD. World list of computer periodicals. Manchester: NCC, 1970. 102 pp. £3.00.(SBN 85012 029 2)

This is a combination of a world list of computer periodicals and serials, and a union list of the computer literature holdings of some fifty libraries in Great Britain. It includes all regularly produced serials in the field of computers and their applications—periodicals, newsletters, loose-leaf data books which are regularly updated, regularly produced directories, and book series which appear under a common title; but it excludes publishers' series, report series and journals on the fringe of the computer field, e.g. operational research.

The titles are arranged by BUCOP form of entry and there are copious references from alternative titles. Periodicals beginning with numbers appear at the beginning of the sequence.

Each main entry is basically divided into three sections: title and dates of publication, information on title changes, and holdings. Locations are given under the main entry. A key to the locations appears in the front of the list. National Lending Library holdings are included but they are not guaranteed to be 100 per cent accurate since a number of titles were added after their shelves were checked.

The list has deliberately not included details of publishers as this would have greatly increased its size, but sources for this information are given.

PEMBERTON, J. E. British official publications. London: Pergamon, 1971. 315 pp. £3.00. (SBN 08 016495 1)

This book sets out to describe all categories of British official publications, from the governmental and parliamentary processes from which they derive to their form of publication, availability and use.

Together with an informative description concerning the background of official publications, the book includes a concordance of Command Papers and a table of Regional Years, as well as two useful lists of Royal Commissions, 1900–69, and departmental committees, working parties, tribunals of inquiry, etc., 1900–69. There is also a detailed index of subjects, titles, authors, and committee chairmen.

This volume will be of great value to anyone who has recourse to British official publications or sources of information on them.

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Director, Mass-Observation Archive

Paper presented at an Aslib Evening Meeting, Wednesday 19th May 1971[1]

MASS-OBSERVATION as a word was first used (without the hyphen) in the *New Statesman and Nation* at the beginning of 1937 when we published letters about this idea; and from the beginning we really meant what we said. It is worth having a look at the word itself, because its meaning has altered somewhat over the years. By 'Observation', we meant, of course, observing; and by observing, inferentially, we meant primarily observing by eye, looking at situations—though also by nose, ear, touch, using all of one's senses in fact. We did not mean, in the first place, simply asking people questions. We wanted to observe what they did, not what they *said* they did. In those days, any attempt to study society as it really was in England was certainly pioneering, in a way that it is difficult to remember now. The Gallup Poll had just started and was treated with a good deal of caution, as is the case again at the moment! The whole idea was novel in those days. But what captured people's interest in our case was the idea of *observing*. I have not changed my ideas about this, alas, though I have changed many of my other ideas in the last third of a century.

The 'Mass' part of it echoes rather differently today. In those days, there was a much bigger dichotomy between the public schoolboy (as I was) and the people then called 'working class'—the proletariat. This dichotomy is obscured by many other factors today and is not at all conspicuous now; 'Mass' has become a condescending term. Still, the concept meant a deep, wide look at *ordinary* people. It did not concern itself with the important 'top people' who could look after themselves, and who were being fully observed and cross-observed by each other, and in the Press, *ad infinitum*—these are the diarists of their time in the usual line of thought.

Basically, my idea was not to take words into very much account anyway. It was the behaviour of people we had to study. I thought then (and think now) that the first training of a good observer of human behaviour in your own society is by giving each person a pair of earplugs and then allowing him (her) to work out what people are doing, without him (her) knowing what these people are *saying* to each other. Willy nilly, though, one ends in words: thus this talk, thus the Archive I am talking about.

I should now like to give you, as members of Aslib, a picture of this Archive in my own words, then, willy nilly. The Archive consists of the results of the activities of Mass-Observation, which were carried out in two related ways. The first approach, which was my own approach, consisted of using trained mass-observers.[2] As a professional zoologist I had been on a number of scientific expeditions—well financed by the Royal Society, the British Museum and other bodies—to various parts of the world. (It was easy in those days to obtain financial backing for that sort of activity.) But I gradually grew tired of studying those situations. Although birds cannot speak words to you either—a great advantage to clear thinking in ornithology—I wanted to apply those methods scientifically to my fellow humans in Britain. I wanted to be *objective*.

The other approach was less ostensibly 'scientific' and came from Charles Madge, then a reporter on the *Daily Mirror* and a talented poet (married to Kathleen Raine, our greatest scholar of William Blake); Humphrey Jennings, a very talented film-maker—many of you may remember his war films (he died tragically after the war); and a number of other documentary film-makers, like Arthur Elton, Basil Wright and Stuart Legge. All these people thought in terms of organizing a panel of people who could subjectively record a mass of material through personal documentation and random observation. This was rather more of a camera or literary, even a poetic, concept than mine, though I warmly supported it.

Having made contact with each other via the *New Statesman*, early in 1937, and having realized that there was a wide response to our idea, we decided to join forces. Charles Madge and I more or less ran the whole organization by ourselves for several years, until he became involved in more academic activities. Then he became Professor of Sociology at Birmingham University; now he lives in France, and we remain in close touch. So in the end I inherited both sides of the organization. I ran them both, in effect, from 1940, until I left the British scene after World War II.

It was this double-sided approach, hopefully co-ordinated, that made Mass-Observation 'different'. It is pleasing to find the term stands on its own merit in *Webster's Third New International Dictionary* (London, 1961, p. 1389) as:

> *Mass Observation* . . . an original and chiefly British method of ascertaining public opinion and the public sentiment by study of diaries and subjective writings, private comment and interviews on general subjects, in combination with quantitative surveys and polls. *Abbr.* M.O.

We never denied the methods involved with the last three words of that definition, *provided* they were 'in combination with' the rest. It is the rest which makes for depth and understanding, as well as providing the actual, intelligible 'reading matter' which still remains decades later. The large *Dictionary*, published by Random House, says much the same, omitting the 'British' and emphasizing 'diaries and other personal documents' (New York, 1967, p. 881).[3]

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At the peak of our activity, which was really from 1937 to near the end of the war, we had up to forty wholetime paid observers, and over one thousand other people, throughout England, who made up our voluntary panel. The panel was recruited at first through the *New Statesman*. There was an obvious bias in that, so that afterwards many were recruited through *John Bull* (now extinct) and other more 'right-wing' publications. These were voluntary observers who would do almost anything we told them to do. Up to the beginning of the war they answered questions for us each month on specific subjects, reported on their homes and families, observed their environment, wrote down lavatory graffiti, studied smoking and drinking habits—whatever we told them to do they did.

Then, in the autumn of 1938, before the war came, we thought, like many people, that England might suffer some very heavy bombing and communication would then be very difficult. In case this happened, we decided to initiate a war routine amongst our panel of observers. Many started, therefore, to keep diaries, as a precaution against our being unable to communicate with them. About five hundred opted to keep these daily dairies from this time onwards, without further instruction from us. Some of our most important archival material lies in these war diaries, for it is this material which is the most candid, truly private and natural.

Now I would like to move more fully into the archival present. To make the transition, I would like to read you the first page and a half of the first report I made for the Vice-Chancellor of Sussex University, Asa Briggs, who was responsible for getting me to bring the Archive to Sussex and has encouraged me in every way since:

> Mass-Observation was initiated primarily by Charles Madge, Humphrey Jennings and myself in 1937. After the beginning of World War II, I became solely responsible for the operation and remained the sole owner until 1949, when it became a Limited Liability Company, primarily concerned with commercial market research. All the papers and documents collected by Mass-Observation and the reports written for external or internal use during the period 1937–49 became the property of the present writer by agreement when the company was formed, after I decided to work in Borneo as Curator of the Sarawak Museum. These documents are presently on loan to the University of Sussex in the hope that a long term project may be developed at Falmer, both (a) as a research amenity for others, and (b) as a source for a series of publications covering the social history of this period—insofar as the Mass-Observation documentation may or may not throw significant light.
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> The purpose of this first initial report—one in a series—is to begin an attempted assessment of the quality of material now in store in the University Library. The *quantity* is there for all to see, though at present an undigestible and largely unclassified bulk of massive raw paper. This bulk includes tens, no hundreds, of thousands of pages of nationwide and often pretty random observations and conversations, on many themes, several years' intensive field work in Bolton ('Worktown'), monthly reports submitted over up to thirteen years by members of the panel of 1,500 men and women voluntary mass-observers, the day to day diaries kept by some 500 observers over these years—and much else. In addition to this basically raw material, a large part of which has never been written up or otherwise used, there are three 4-drawer filing cabinets full of listed, numbered, and fairly accurately arranged typewritten reports which were prepared from raw material for clients of various kinds or as documentation to feed back to the observer panel and thus retain their interested co-operation. These file cabinet reports are the only part of the whole easily manageable and accessible to handling at this stage—the rest of the archive has suffered from more than two decades' lying about in bundles tied up with string, which have somehow survived *eight* moves—and in one sector, occupation by a nesting colony of mice.[4]

That was how I wrote, somewhat cautiously, at Falmer in April 1970. Since then I have been able to recruit the help of some very able people, including graduate students. With money generously provided by the Leverhulme Trust and from a private source, we are gradually getting this pile of paper into order. It was for this reason that I refused an Aslib invitation last year and yet gladly accepted one this year. Last year I could not, today I can, tell you with increased conviction a little more of what we know is there, not just what is *supposed* to be there.[5]

Apart from one small exercise while on leave from the Colonial Office a few years ago (to write a book called *Britain Revisited**), I have never looked at any of the raw material since I left M-O. So I have not handled this material for over twenty years. This turns out to be a considerable advantage. I come to it again from the wilds of Borneo, where, for some of the last twenty years, I have not even been speaking English. Social research has not been a continuum in my life. This helps to place and attribute the old information from a world once known intimately. Borneo, a green veil, lies between two phases of life.

I should make it clear that the Archive, as well as consisting of a rich firm base, does of course consist of a great mass of trivia, and what one might call 'rubbish'. Alec Hughes, my chairman at this meeting, will confirm that he, like anybody who worked for me, suffered from my obsessive devotion to collecting anything and everything which is at all curious or 'alive'.

We have a great deal of material, therefore, which, when recorded long ago, seemed 'meaningless' and unco-ordinated. But now that we are beginning to look at it again, some of this material appears extremely interesting, and gives us bright vignettes and insights into the activities of that time. I am reminded here, having worked on archaeological excavation during the last twenty years, of the unbeautiful broken flakes of neolithic pottery that I have dug up by the tens of thousands—these potsherds are in some ways like this mass of written and spoken material which has come from the detritus of the M-O past. But I would certainly not like to give the impression that the material as a whole is now in a highly organized state. Some of it may remain difficult, diffuse; yet much of it is suddenly becoming relevant again.

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I should now try to give you some idea of what, physically, is in the Archive. We have the material stored in about one thousand cardboard boxes, 13 × 11 inches each, which were recommended to us by the University Library. All the papers are now, broadly, initially classified. That has been a difficult job, since, physically, the material had become completely disorganized. There is at least a provisional pattern. Each box is in some order with its contents labelled. Next we have to co-ordinate and correlate all the material, which is a job in its own right. At present many boxes contain only approximate arrangements of loosely associated documentation, on the basis of subject, or place or date—sometimes all three. For, in this type of material, categories and separations can be obscured by other factors, and to re-impose facile order may even defeat the object of the exercise.

However, there is still a lot more which has *not* yet been classified at all, including, for instance, an enormous trunkful of observations largely made on the coronation, on 12th May 1937, of George VI. (We published a book on this subject but there is much more in hand.) We also have a number of other old boxes which no one has had the courage to look at yet, since they are in such a disorganized state. We also have three filing cabinets in excellent shape and a number of early file systems containing directives to the panels, publications, and also the newsletter which we distributed to our observer panel, which runs to five hundred pages.

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* See Appendix for a list of the main M-O publications.

In the three filing cabinets there are nearly three thousand typewritten reports, which average about ten pages each. (The hand-written material far exceeds this number, of course.) These reports deal with matters such as 'follow-ups' on government publicity, that were distributed at the beginning of the war, when we were working for the Ministry of Information (and later the Admiralty). They also include observer studies of each film made at this time by the MoI. We also did a series of 'overhearing' conversation projects, the results of which we reported to the Government. We covered the air-raids throughout the war, as both observers and participants, not just by asking questions about them. We also have a great deal of information on leisure studies, especially smoking habits, drinking, reading and library use, sport, and so on. We have a number of special studies on anti-semitism which developed later into studies (in another sense) of anti-Americanism. This relates to a social issue which did not exist then, namely, that of race-relations and the colour problem. All these are subjects on which our files are strong.

The war diaries, mentioned above, have now been put into some sort of order. This proved to be quite a problem. At the end of the war, we were relying, to keep up the M-O office work, mostly on people who were physically unfit or who were conscientious objectors. The work was directed largely by Bob Willcock, later 'number two' in the Wartime Social Survey, who was physically unfit and who carried on the work under enormous difficulties.[6] We did not have the staff available to deal with the panel any more and as a result we became inundated with the war diaries, which began to pile up into a glorious agglomerate. We have now managed to organize the diaries, recording each diary's input, the number of pages completed per month, and so on. Soon we hope to have particulars of every diary recorded on cards. My next plan is to resume contact with selected diarists, providing I can get the funds to do this; perhaps I could even get them to start writing their diaries again—after two decades of silence!

That should give you a good idea of the scale, in physical terms, of the Archive. But basically, of course, it continues to remain as a harsh mass of paper. We are only halfway through stage 1 of the project. There may be at least three more stages to go; but I think that by the end of 1971 we will be able to decide on how, eventually, the Archive may best be organized.

At the present time, owing to the limitations on space in the University, we have had difficulty in obtaining access to the material. We hope soon to move into much better facilities in the new library extension, but at the moment we cannot get more than three or four bodies into the present storage room at the same time.[7]

To sum up so far: we have in the Archive a solid bulk of material which documents what a large number of people did, wrote, said and (in a certain sense) thought, during the period 1937–49. Our long-term aim is, eventually, to make this material accessible to others.

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I should like now to discuss the possible applications of the Archive. As mentioned in the report to Professor Briggs above, its first two major functions are to provide a research facility to others, and to act as a source for a series of extensive publications covering the social history of the period.

Firstly, as a research facility, we have already proved of some value, even before becoming fully organized. In the interval between the papers being transferred in 1968 from Mass-Observation offices to Sussex University (this was before I arrived at Sussex—I was still working in Borneo and then at Cornell University) several people had had access to the Archive. Four of them in fact relied heavily on the Archive for material for their books; Derek Parker wrote a book on astrology, Constantine Fitzgibbon and Angus Calder have written on aspects of the Blitz and the war; and, since I have been in charge, Leonard Mosley has written a book, recently published, about life in London during the whole period of the war. Some of these writers have very kindly suggested in their books that they have not found any other way of getting this sort of information other than through the Archive, even though they were working with it in pristine form and under special difficulties. Eventually we hope to provide fuller data on social and political questions of the time, by indexing and referencing to a wide range of topics.[8]

Since April 1970 we have had to close the Archive completely. No one from outside is working there. Even the few people who worked on it have sometimes, accidentally, put the material into an even worse state by picking out things that interested them, and not replacing them in the same place, and so on. We shall have to organize the Archive thoroughly before we can open it again as a research facility.

If one compares the Archive files with the picture of the 'thirties that one finds in such books as the one by Malcolm Muggeridge (*The Thirties*), one can see that there is a certain discrepancy between Muggeridge's account of what was happening with the 'mass' at this time, and the account which is reflected in the material held in the Archive. For information about the 'thirties or 'forties the writer is usually driven back on to the Press and other 'higher level' information sources of the period. The main drive behind the establishment of Mass-Observation came from the feeling of dissatisfaction with the level of information that I call 'published opinion'. We were trying to get down below, below public opinion even, to the level of private opinion; even into 'non-opinion'—dream, hope, fantasy, the unfelt, the things people do 'without knowing why'. There is very little information about this area of knowledge that is centralized in any one place. A recent review by Charles Wilson, in the *Spectator*, of the excellent new book by Noreen Branson and Margot Heinemann called *Britain in the 1930's*, asks:

> How reliable is this picture of the thirties as a time of almost unrelieved misery for the majority? Was everybody in office so stupid, and everything so patently wrong as this survey suggests? Was this in Auden's line simply 'the low dishonest decade'?

From what I have learned from the Archive, I would provisionally say 'no' to these questions. The sort of documentation one gets from the Archive gives a different picture from that set out in books written by most historians of the period. But, of course, that is only a provisional answer. The original data must be fully, impartially studied, from several points of view, and in the end run as part of that first function.

Our second function, of course, is to arrange for the publication of the material, doing this either on our own, or in association with other bodies. We could probably bring out publications fairly regularly providing we can get experienced people to help edit the material. The material *is* difficult to edit, and one of the mistakes we made in the 'thirties was to publish certain parts of the material much too quickly, in order to meet the public interest. In the case of the diaries, for instance, with intensive work by a group of people, a fascinating series of volumes could be published over a number of years.

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A third role of the Archive which I had not previously considered, until this year, is the re-application of the M-O method in terms of further research. This could mean re-applying the M-O method in order to establish a real *contemporary* Archive; or it could mean using the Archive as part of an actual continuing research project. For instance, next week I am going to attend the by-election at Bromsgrove in Worcestershire, so that I can then compare the pattern of this by-election with the material which we gained from our coverage of nearly every by-election in Britian during the period 1937–49.[9]

No matter how small Mass-Observation's contribution to sociology was in the past, in impact and disturbance at least, that small contribution has almost entirely disappeared. Sociology has come back to relying on glorious techniques of making theoretical 'models' of society, making statistical projections, and so on, its major reliance being on interviewing methods. 'Modern' techniques, especially where they exclusively involve using words people say to a stranger in a formal interview, are clearly open to grave objections. They are not usually so conspicuously barren as they were during the last General Election. But this is the base of most current social research. Very much the same is happening now as happened in 1937–9. One of the things that made Charles Madge, Humphrey Jennings, myself and others engage ourselves in this operation then was that we felt, not only instinctively, but by experience and by observation, that there was a serious and growing gap between what was printed in the newspapers and what was in the ordinary public mind. In the interval, opinion polls have developed as a supposed way of reporting and filling this gap—that was their real first function. But they have become so much part of the Press (and television and radio) itself, so much part of the pattern of what we might call 'established communications thinking', that they have lost this bridging function. They are no longer asking enough necessarily basic questions, some of which, anyway, cannot be asked in a purely verbal way. In some situations this method is practicable; for others it can be worse than misleading, both immediately and on the long-term record.

A speech by Hugh Cudlipp, who himself actively encouraged us in our work with M-O when he was a newspaper editor and not yet a Fleet Street mogul, was recently reported in *The Times*, thus:

> Speaking in London on the last day of the international congress of the Fédération Internationale de la Presse Périodique, Mr. Cudlipp said that every street demonstration was a criticism of the mass media and of our rulers. The 'demo' usually meant that people were driven on to the streets to express their ideas because they had not been expressed with sufficient frequency and passion in the mass media, and not been understood and properly answered by the politicians.
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> Just one brilliant editor, he said, was worth far more than all the egg-heads and market research gremlins in the world.
>
> *The Times*, 7th May 1971

But now, as in the 'thirties, it has perhaps gone beyond the power even of a 'brilliant editor' to bridge the communications gulf. The media has lost the mass. This was well put only the following day by Dennis Hackett, a director of IPC (and formerly of *The Observer*), who wrote:

> Popular newspapers are suffering from a gradual erosion in readership which, we were always groaning incredulously to each other at IPC, in the vain hope of contradiction, amounts to 7 per cent over five years. The usual reasons are that this is accounted for by frequent price rises and competition for leisure time from radio and television. There is something in all these—especially the first. But there is a need to think about whether papers have remained ***in touch with their audiences.***
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> *Spectator*, 8th May 1971

This communications gap is important, in the present context, because it relates to the Archive directly: that is why M-O began! We felt that the published media were not giving an adequate picture of life in Britain. Since then there has been a tremendous growth in sociology, including so-called psephology, which is becoming one of the most powerful and well-organized procedures in Britain. The social sciences have moved away into what I regard as a 'statistical obsession' or 'theoretical formulation delicatessen'. These have allowed the researchers to lose sight of 'real life'.

To give broader authority to that statement, I would like to quote from two social science sources. Firstly, from the Chichele Lectures given in Oxford last year by Sir Roy Harrod, the distinguished economist. The underlying theme of his lectures was the failure of social science as a science. At times he made this forcefully explicit; so much so that he ends the final lecture with these stirring words:

> Is sociology a science? I hope that I have given you sufficient reasons for thinking that it ought not to be so considered, and, more important, sufficient reasons for thinking that it ought not to *desire* to be so considered. But yet I hold that, in this phase of human history, it is the most important subject of adult study.[10] (His italics)

This reminds me of a remark generally attributed to Groucho Marx, when asked (by an interviewer, no doubt) if he had ever considered the work of his brothers and himself as Art. He replied: 'I don't think the word Art—which happens to be my son's name—has ever come up in my thoughts.'

A second and equally distinguished authority is Professor J. B. Cullingworth, Professor of Urban and Regional Studies at the University of Birmingham.

He heads the impressive new Centre for these Studies, at Selly Oak, adjacent to the campus. His Inaugural Lecture is very much to the present point; especially as regards the proven inadequacy of statistics over a wide field. I will quote two passages:

> The essential ingredient of planning is prediction. Urban and regional studies, if they are to be anything more than cross-disciplinary intellectual gymnastics, are similarly concerned with prediction. If prediction is impossible, urban and regional studies must be largely an academic extravagance—stimulating and absorbing, maybe, but little else. Prediction, however, demands an understanding of the present and an identification of the relevant determinants. It is easy to show how wrong past predictions have been in many fields: population, car ownership and use, the demand for electricity, doctors, and higher education, to name but a few.
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> But these projections are typically concerned with one factor only. Others may be taken into account but only as subservient blocks of data to enable the variable at issue to be computerized. Indeed, extremely important inter-related variables may be omitted completely.

Or, again:

> Yet, in spite of the fact that each year, nearly a tenth of the population move, we know remarkably little about who moves where and why. We are able to describe and map certain patterns of growth and decline, but our understanding of the dynamics of change is extremely limited. Furthermore, we are very much slaves to the statistics which are available to us. We have, for instance, an extraordinary abundance of figures on persons and rooms and can thus measure the intensity of use of housing space to several decimal places. But the flow of these statistics has increased at the very time when they are of increasing irrelevance.[11]

It would be easy to elaborate on this theme. The point for emphasis here is that the levels of leadership, politics, media, and so on, have indeed become 'the slaves of statistics'. Proper use of the M-O Archive in the future may, to a small but significant extent, help find a way to break these chains and bridge this knowledge gap—as we sought to do, unsuccessfully, from 1937, in a too youthful, incoherent and at times arrogant way. In particular, it should not be difficult to re-observe in the late 'seventies exactly the same situations as we observed in the late 'thirties; and in that way we can get some demonstrably objective yet documentary and alive measures of social change.

Forgive me for straying a little far from the Archive! But it is a timely thought that one can do this sort of thing with old paper as well as new. In the final analysis, however, both the function and the fun of all this lies in the fact that the raw material is that fearsome thing '*authentic*'. One feels in those thousand boxes the authentic England. Where I am staying now, near Falmer, I am doing the thing I did thirty or more years ago, my thing—listening to Britain. Here is a conversation which I jotted down in my pub on the Downs before I left to give this talk tonight. These four overheard sentences *are* the English language, the vivid, local intelligence, the dynamic feel of an island. Has it changed over hundreds of years?

Three elderly men are seated, with pints, at a window overlooking the Downs, in noon sunlight:

FIRST MAN (the oldest): 'It's a nice county, Sussex, isn't it?'
SECOND MAN: 'It is . . .' (pauses about 20 seconds) 'There's Buckinghamshire, that's nice.'
FIRST MAN: 'Don't know it.'

Only sipping soothes the silence of the following minutes.[12]

APPENDIX

Main Mass-Observation Publications, 1937–49

1937 *May the twelfth* (the Coronation of 1937). Faber and Faber.
1938 *First year's work, 1937–8.* Lindsay Drummond
1939 *Britain.* Penguin Special.
1940 *War begins at home.* Chatto and Windus.
1941 *Clothes rationing survey.* Advertising Service Guild (John Murray).
1941 *Home propaganda.* Advertising Service Guild.
1941 *A savings survey* (Working Class). Privately printed for circulation.
1942 *Enquiry into British war production (part 1, People in production).* Advertising Service Guild (John Murray).
1943 *War factory.* Victor Gollancz (2 editions).
1943 *The pub and the people: a Worktown study.* Victor Gollancz (3 editions).
1944 *Journey home.* Advertising Service Guild (John Murray).
1945 *Britain and her birth-rate.* Advertising Service Guild (John Murray).
1947 *Puzzled people: a study in popular attitudes to religion, ethics, progress, and politics in a London borough*; prepared for the Ethical Union. Victor Gollancz.
1947 *Browns and Chester: portrait of a shop, 1780–1946.* Lindsay Drummond.
1947 *Exmoor village,* by W. J. Turner. Harrap.
1948 *Report on juvenile delinquency,* by H. D. Willcock. Gray Walls (Falcon Press Book).
1949 *The Press and its readers.* Advertising Service Guild (Arts and Technics Ltd).
1949 *Meet yourself on Sunday.* With drawings by Ronald Searle. Naldrett Press.
1949 *Meet yourself at the doctor's.* With drawings by Ronald Searle. Naldrett Press.
1949 *People and Paint.* ICI publication.

There have only been two books in recent years:

1961 *Britain revisited.* Victor Gollancz.
1970 *The pub and the people: a Worktown study.* Seven Dials Press (Welwyn Garden City). (Reissue of 1943 volume, courtesy of Miss Livia Gollancz; with a new Introduction and previously unpublished photographs by Humphrey Spender.)

NOTES AND REFERENCES

1 This paper is taken from a tape-recording of Mr Harrisson's talk, which was presented unscripted.
2 Some of our best observers of the 'thirties remain in close touch and have offered to help in various ways with the Archive, including Richard Fitter, Walter Hood, George Hutchison, C.B.E., Nina Masel, Humphrey Pease, and Humphrey Spender (especially with his unique photographs taken with M-O at Bolton (Worktown) in 1938–39).
3 The abridged *Random House Collegiate Dictionary* includes 'Mass-Observation', but less happily as simply 'research or poll on public opinion'. *Public* opinion was and is almost the least of our concerns, much of the time.
4 This first report as cited was written in April 1970. Eight others have been completed to date. The terrific job of sorting out the mass of material at Falmer, so that it could be reported, has been undertaken, since the beginning, under the direction of Mrs Sallie Rée.
5 All these remarks are, however, provisional on fuller study of the whole Archive as we proceed; this cannot be over-emphasized.
6 Mr. H. D. Willcock, O.B.E., has just retired from the Wartime Social Survey and may be helping this project in the near future.
7 This move was made in July 1971; but accommodation is still strictly limited.
8 Under active consideration at this time is a plan to make a qualitative index of the Archive by computer. My colleagues, Professor Marie Jahoda and Dr Allison Chalmers, of the Psychology Department at Sussex University, are potentially involved. We must also soon consider the desirability of microfilming the entire Archive. This could help overcome the most serious snag in opening such irreplaceable documentation to outside persons: to put it

bluntly, the fear of misplacement and even theft of papers, which is endangering some existing archives of other kinds, cannot be ignored in the M-O programme.

9 The Bromsgrove by-election operation did, in the outcome, demonstrate that the Archive can be interestingly re-applied to the present; see *The Times* (Diary) 21st May, and *New Statesman* 11th June 1971, pp. 797–8.

10 HARROD, SIR ROY. *Sociology, Morals and Mystery.* London: Macmillan, 1971, p. 115. Compare also his conclusion (p.98) that:

> 'Sociologists are supposed to be experts on culture. In fact they often put culture in the forefront of what they claim to be researching into. Most of their recent writings are replete with linguistic barbarisms, clear evidence to my mind that the authors themselves are quite uncultured.'

11 CULLINGWORTH, J. B. *The Politics of Research.* University of Birmingham (Centre for Urban and Regional Studies), 1970, pp. 3,6. It should be made clear that much of this Inaugural Lecture is constructive and not so critical of statistical and other quantitative processes.

12 This paper has been, partly of necessity at this stage, a very personal one. The project as a whole is not, of course, personal. I have inherited as a trust the work of an enormous number of other people, including some very generous men who helped us financially in the beginning, notably Lord Simon of Wythenshaw, Sidney (now Lord) Bernstein, the late Sir Victor Gollancz, and the Advertising Service Guild through Mr A. Everett Jones. At Falmer I must especially thank not only Professor Asa Briggs, but also Dr Brian Enright, University Librarian, and his deputy Mr Arthur Pollard, for their patient, constant help and good advice. Finally, I must emphasize that I have been describing what *is* in the Archive. What is *not* (as well as what is lost) is another very complex subject. I am only too well aware of the numerous, major inadequacies of the whole.

DISCUSSION

SIMON FRANCIS (Polytechnic of North London): 'What is the physical condition of the paper in the Archive?'

MR HARRISSON: 'As already mentioned, I have been away in Southeast Asia for more than twenty years, during which time the Archive has been moved eight times, usually without anybody specifically responsible for it. Some of the papers and all the arrangement of them suffered considerably. During the past year we have done a great deal of work on repairing and recovering the damage. At a rough estimate, I would say about 2 per cent of the papers may have to be completely discarded—this is nearly all raw material of questionnaire surveys, carried out for customers in later years, and seldom very important. Another 3–4 per cent of the raw material is in a fairly bad state, faded, battered or torn, and will require further consideration in the near future. But about 95 per cent of all that has come through to me when I started at the University of Sussex in 1970 is legible and firm, either in typewritten or handwritten form—mostly the latter.

'Fortunately, the war diaries and three cabinets full of typed and written-up reports are all in good shape, apart from some items that have been lost, mislaid or in a few cases removed by other people using these papers for their own purposes. We are in active pursuit of those we think have taken certain items. We are also trying to find additional copies of reports where these are missing from the files.'

SIMON FRANCIS: 'Would a small tape recorder have changed or improved your techniques?'

MR HARRISSON: 'I take it that you mean techniques for recording and reporting conversations, always an important part of our approach: especially overheard conversations, where the people are not aware anything is being observed. I very much doubt if a small tape recorder, not invented at the time, would have helped much. The general coverage of *all* conversations in any setting is almost impossible. And we were clearly not concerned with any pinpointing of conversations with predetermined individuals—that is the level of espionage; nor with the absolute final validity of the wording so crucial as "evidence". In order to record a conversation, from the M-O point of view, it is necessary for the observer himself (or herself) to establish that a certain group of individuals are having a conversation which is readily audible, but which is in such a situation that it allows the listener to work unrecognized. It can normally only be undertaken in a fairly limited range of settings. In my experience, a trained observer in such settings can record a high proportion of the conversation by ordinary written methods. And this can even become easy—when, for example, people are talking and doing something else at the same time, like drinking or playing cards. In fact, a considerable proportion of ordinary conversation in Britain is conducted much more slowly than most people realize, although, as far as I know, we are the only people who have done much serious general study in this field.

'The important point, however, is that, through this method, one obtains from the observer, completing the report at home and, if necessary, typing it out properly, a "document" that can then be studied and filed on the spot. Tape recording, on the other hand, involves a large secondary operation, and the recording itself is often very difficult to interpret, especially in the correct allocation of sentences, words, interruptions, etc., to different individuals who are not (by definition) known to the observer and who cannot be 'reconstructed' by sound alone afterwards; but that is, after all, the whole point of the operation.

'Also, in general, the use of a mechanical recorder may tend to obscure the necessarily intelligent function of the observer himself (or herself). This is a very important part of any M-O operation. Though it would be desirable to record and analyse everything, in practice this is almost always impracticable. The work of being a mass-observer requires a high level of concentration and special skills, including intelligence. I view mechanical aids with some caution, though certainly not at all with rejection—I have spent hundreds of hours recording in other languages in Borneo over recent years.'

MICHAEL HUGHES (Hertfordshire County Library): 'One of the problems of the M-O method is that of subjectiveness and that of selectiveness of the observer, which will vary between individuals. Did M-O ever set up any comparative tests of observers, to cover the possible variations, with a view to guarding against them?'

MR HARRISSON: 'Yes. This is, of course, a familiar problem in interviewing, one which the opinion polls and market researchers guard against partly by the formal sort of questionnaire, leaving a minimum of possible errors which the interviewer could make; plus, one hopes, adequate supervision and checking at the inspector-type level. In our type of work, where the set interview or formal approach is not a primary consideration—or at least should not be a primary consideration but rather a subsidiary tool—the difficulties are perhaps greater; though still less great than the difficulties which occur when *individual* sociologists conduct an elaborate investigation. Such problems are implicit in the whole of science, indeed in any research.

'We carried out several experiments on this, some of which had quite amusing results. For instance, during a critical period, late in 1939, when opinion was beginning to move strongly against the then Prime Minister, Mr Neville Chamberlain, I noticed that a lot of latent hostility against him, which people had not been prepared to express, out of loyalty, in previous months, was beginning, out of sheer frustration, to show itself. This is part of the mechanism by which what I call *private* opinion moves into *public* opinion—something not sufficiently researched. In this case, we had one very elegant, six-feet tall, Old Etonian (with tie) asking questions about attitudes to the Prime Minister and Government generally, while another of our regular staff, a very scruffy, diminutive poet (afterwards, alas, killed in the Middle East) worked on exactly the same "sample", asking the same questions. The tall Etonian received relatively few, and nearly always soft-spoken, condemnations of Chamberlain. Simultaneously, the (to be frank) rather dirty little "Bohemian" was recording a bombardment of outspoken hostility.

'Anyone who cares to study our Archive's material from the anthropological point of view—and I hope this will happen in the future—may find many examples of this sort of occurrence. It is something which has to be taken fully into account in interpreting and writing up reports. Put very briefly and generally, I would say that it is never really desirable for a full-time field observer to have a major role in writing up any *final* report. Such report writing, summing up the wider conclusions and making deeper analyses, should be undertaken by a person or persons who study the written material they receive from several sources. But it is also highly desirable that the writers should themselves be familiar with the field situation, not merely write in isolation. I myself always tried to identify closely with the situation of the researches we were conducting.'

ANN SUTHERLAND (Tavistock Institute of Human Relations) 'Could Mr Harrison explain in more detail what type of thing the diarists, self-observers, were recording—was it things suggested by M-O, or was it anything that caught people's attention?'

MR HARRISSON: 'Delighted. Perhaps I should emphasize that the diarists developed as such from out of the original, wide panel of voluntary observers recruited from all over the country. This panel received monthly "directives" (as we called them), asking them to make particular observations for that month. These might be observations of themselves, detailed answers about their *own* lives, their dreams, the furniture of their homes, and so on. Or they might be asked to do observations of other people, their families, strangers, mantelpieces, conversations, elections, behaviour in pubs, or anything else outside. We tried to keep this pattern varied, to keep the observers interested. For years, though somewhat erratically, we ran a newsletter, feeding back to this panel of observers generalized and summarized results of their national coverage. We found this effective. At one stage we ran a small magazine called *Us*, of which a complete file is in the Archive. This was distributed to a restricted panel and special friends and never came on to the market at all.

'In the case of the diarists, no directive was sent to them. This was an important part of the concept. They were to spend the whole war, year after year, writing down spontaneously whatever they thought and felt and did, no matter what it was, and then to send the completed diaries to M-O as and when they could. I think it is this one activity more than any other that gives a possibly unique value to the Archive. These people developed a special relationship with an invisible M-O Office. They poured out their hearts and their lives. There was no thought of publication or impressing anybody else, or doing anything than their own "thing". These are not diaries written to please anybody or justify anything.'

F. LIEBESNY (Transociates Ltd): 'Is annotation, evalution, editing and, if necessary, translation of the Archive intended?'

MR HARRISSON: 'Yes, we certainly intend to annotate, edit and, where necessary, translate the Archive. Evaluation is perhaps rather a different matter. I feel that we should, as far as possible, present the whole material so that it can be evaluated not only by ourselves but *by others*. Our first job is to present a true picture, without judgements. There is a danger in letting too much evaluation begin at the point of origin by those working at the Archive itself. On the other hand, clearly there has got to be selection, at least in the first few years—if only for financial reasons.

'I am strongly of the opinion, in hindsight, that the early publications of M-O did not take nearly enough trouble to edit, annotate and correlate. The glaring example of that is the wonderfully rich book on the Goerge VI Coronation, published by Faber and Faber before World War II. The amount of published material is tremendous: and the raw material, all of which is in the Archive, even more so. But the book was put together in such a way that it has little value either for readership or for interpretation of the whole saga of ritual which it documents so uniquely. I do not think it is enough to merely publish the diaries, or any part of them, or anything else. We must relate them to the actual events that were going on in Britain and all over the world at that time. We must also relate them to each other. This is going to take a great deal of work. But that work has to be done. I would not, initially, be in favour of merely publishing great chunks of raw material in itself, because I think it would give everybody premature indigestion, and mask the real intellectual and scientific value of the diary and other material as it stands. That particularly applies to the diaries, because they are the most diffuse documents of all. On the other hand, I believe *every word* on the Archive is "relevant", and no part of it can in the long run be set aside as otherwise. This was an important part of the original M-O approach. Nothing that has happened to me in the years between makes me feel we were wrong in that.'

ALAN MACGREGOR (OSTI): 'Has your experience in coming back to the Archive after twenty years given you any insight on criteria selection of material, or does one have to keep everything?'

MR HARRISSON: 'Since during those intervening twenty years or more, I have been curator of a museum in Asia, as well as largely engaged in field archaeology, my immediate response is to say "keep everything". At that level, selection can be most dangerous. Once you have kept everything, *you can select from it*; and others can repeat the process in different ways. If people "from the top" are going to process by selection in the early stages, all the errors and prejudices and bias they bring into it can permanently prejudice the judgement opportunities of everybody else. On the other hand, mere space, time, money, personality, etc., clearly at every stage, bring in forms of selection, even though these may be "unconscious".'

IAN ANGUS (University College, London): 'Did Mass-Observation make a point of keeping material like Mosley's by-election leaflets and literature, advertising matter, posters, etc.?'

MR HARRISSON: 'Definitely yes. Some of my colleagues and employees considered I was a "maniac" on this matter of collecting every sort of raw material. That was one of the great advantages of our panel. We could send out instructions to them saying: "This month collect parish magazines, and every sort of religious propaganda throughout your area". A deluge of material would result. We had, indeed, such a vast deluge that it occupied more space than the Archive now in the University of Sussex.

'In my absence in Borneo, my colleagues in Mass-Observation, which continued as a market research operation, lost interest in this sort of thing. Without my fully realizing what was going on, they treated this as separate from the Archive of written material itself, which was promised to me. All this material was presented to the Imperial War Museum. I am proposing in the near future to enter into negotiations with that distinguished organization to see what we can do about it. Perhaps it "belongs", naturally, with the Archive in the University of Sussex. It is an integral part of the same unit and unity. Maybe we can do a reciprocal deal or duplication.'

F. C. A. EXON (University College, London): 'What techniques are being considered suitable for assessing finer details in the data bank of the Archive?'

MR HARRISSON: 'Whatever techniques are offered. I am all for making it open to every sort of data processing and analysis methods, once we have got the Archive into good order. I must, however, emphasize the *once*. We are wading through a mass of data, which is very far from being sorted out and ready for systematic study.

'On the other hand, if I can receive constructive suggestions from specialists such as those here tonight, it may greatly facilitate the actual speeding up, or at least the adequate arranging of such material for future analysis. I would welcome assistance on this point. And it is one of the reasons I have been so pleased to accept Aslib's invitation this evening.'

JOHN GRETTON (*New Society*): 'I am glad to hear that the item in *New Society* the other day, about some of the material having gone to Cornell, is erroneous. Is there anything you would care to add on that?'

MR HARRISSON: 'Yes, in that I should like to make it clear that my relationship with Cornell University in America has entirely been concerned with my twenty years' work in Borneo on anthropology, archaeology and to a lesser extent, conservation. Nothing I do there has anything to do with Mass-Observation, or anything else in my European field of work.

'Incidentally, what I have been saying does not necessarily mean that we are "freezing" the Archive at this point in time. It may well be desirable to extend the Archive and bring in other sorts of material, as I have already indicated earlier this evening. We need not consider this as a dead thing of the past, but equally as a continuation into the future.'

THE INFORMATION USES AND NEEDS OF SOCIAL SCIENTISTS: AN OVERVIEW OF INFROSS

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Expanded version of a paper presented to the Social Sciences Group, 1st June 1971

Background

When INFROSS began in the autumn of 1967, although a large number of studies had been conducted into the requirements of scientists for information, very little had been done in the field of social science information. There are a number of possible reasons for this. Social scientists, faced with a much smaller total volume of information, were much less information-conscious and less inclined to seek for solutions. There are very few specialist libraries in the social sciences, and few librarians were therefore confronted with social scientists' information needs in the same way as librarians in scientific libraries were confronted with users and their problems. Finally, until OSTI came along there was little in the way of funds to support this kind of research. This almost total absence of previous research had its disadvantages and advantages. There were very few clues to guide us, and we were therefore working to a certain extent in the dark. On the other hand, we had a clean and open field uncorrupted by confusing and non-comparable studies. There is something to be said for being one of the first in a field. (For an extended review of relevant work previously carried out, Michael Brittain's book[1] should be consulted.)

At any rate, an investigation seemed urgent, particularly as it seemed likely that some of the solutions found to be viable in the sciences would be applied in the social sciences, although there were good *a priori* reasons for thinking that the problems were quite different. Also, the social science information system was developing anyway, and if it was to develop in appropriate ways, some guidance had to be provided quickly. One of the problems with many of the science user studies is that they have shown after the event how inadequate and inappropriate many of the existing tools are, but by that time the tools had developed to a stage where they could not be individually redesigned very easily, and, more important, as a total information system there was no hope of rational systematization. This need for urgency meant that we were faced with a very large area of virgin territory, which had to be covered quickly—there was no point in exploring one small part of it, since this exploration would have to be followed by other smaller explorations, and the various studies would be difficult to link together, if only because they were conducted at different periods of time. Instead of the Columbus approach—landing on a continent and hoping you find something interesting—we chose therefore the aerial reconnaissance approach: a general overview of the whole territory. We realized that this would inevitably be superficial, but we felt, and I still feel, that we had no alternative; and, as I shall suggest later, the ability to compare different categories of user within one large study has been a tremendous advantage.

Conduct of the investigation

Three methods were used in the investigation. The main method was a questionnaire circulated to a national sample drawn from a population of all the social science researchers we could find. The sample consisted of two in every seven identifiable researchers—this meant that the questionnaire went to 2,602 individuals, of whom 1,089 (41.8 percent) returned it completed, some of them after the second reminder. Inevitably, some of the individuals to whom the questionnaire was circulated had left the population for one reason or another—emigration, illness or death (it is believed that none of these was actually due to receipt of the questionnaire). Because of our need to cover a very large area, we had to have a very long questionnaire, whose bilious green colour still raises the gorge in social scientists all over the country. In Schubert's song cycle *Die schöne Müllerin* the hero sings of his great hatred for the colour green; a sentiment which would be shared by many of our respondents, and by even more of our non-respondents. At the end of the questionnaire, where we asked for suggestions for improvement of the information system, one person stated: 'Your questionnaire is so long it has drained me of any original thoughts on the matter'. Like all questionnaires, faults became apparent as replies came in, in spite of two pilots and some expert help. I can only say that a great deal of thought went into its general structure, the order of questions, and the wording of individual questions; every question was designed to provide information on a specific point considered to be of importance. As far as we could tell, our sample turned out to be fairly representative of the population of social science researchers in the country, though there are few general collections of figures with which to compare it.

The second method we used was interviews, with three categories of person: a sample of those who did not respond to the questionnaire (in an attempt to see whether they were non-typical), some who answered the questionnaire but who were worth following up, and some who had deliberately been left out of the questionnaire sample, and who were approached only by interview. Interviews were also used with researchers in government departments, for whom the questionnaire proved to be inappropriate, and with 'practitioners'—college of education lecturers, schoolteachers, and individuals in social work and welfare. The total number of interviews conducted was 125—75 with researchers and 50 with practitioners (since some of the interviews were group interviews, the actual number of persons interviewed was considerably larger).

The third method was day-to-day observation of a very small number of social scientists. Technically this was not part of INFROSS, but a separate project financed by OSTI: an experimental information service in the social sciences was established at Bath University, starting in January 1969, the dual aims being to test the validity of the concept of a personal information service in the social sciences in a university, and to gather data by observation on the day-to-day information habits of social scientists. This service covered social scientists in Bath (on a face-to-face basis) and in Bristol University (by mail).

Reports of the work carried out in 1969 and 1970 have already been produced,[2,3] but here we are only concerned with its contribution to INFROSS, where it provided a useful check on some of our findings from the questionnaires and interviews.

All of these methods have serious disadvantages; we hoped that these would be minimized by the fact that we were using all three, so that they would complement one another and also each provide some check on the other methods.

Analysis

With a very long questionnaire like this, the amount of data produced was absolutely enormous. Simply because the field was unexplored, we carried out a number of analyses that proved in the event to yield nothing of value, but we could not know that beforehand. Some of the computer tables will not be published at all, but those that we did feel to be worth reporting and making available generally still total 384. Our report to OSTI does not attempt to extract every bit of meat from these tables, but they are available to anyone who wants to use them as a mine for his own purposes (with apologies for the mixed metaphors), and some have already used them as such.

Coverage

The social sciences were defined for the purposes of INFROSS as anthropology, economics, education, political science, psychology, and sociology. (Some historians, statisticians and other foreign bodies strayed into our sample, because of the way the sample was taken; this proved to be an advantage, as it enabled us to make useful comparisons.) The main emphasis was on researchers, whether in universities or elsewhere, but we also covered social scientists in government departments, schoolteachers and college of education lecturers, and individuals in social work and welfare. Four reports are being submitted to OSTI, one covering the main questionnaire survey, the other three, very much smaller, covering the three minor areas indicated above.[4,5,6,7]

We attempted to study all main aspects of information need and use, formal and informal alike. It is of course much easier to ask questions concerning the formal system than concerning the informal system, as it is 'harder', more easily identifiable, and more memorable. Questions about the informal system tend on the other hand to be more general and vague, and also respondents tend not to remember informal communications nearly so readily—a conversation with a colleague over coffee is not so readily remembered as an identifiable information use, such as a search in an abstracting journal. To explore informal communication more fully than we did would have required a much fuller use of interviews and of day-to-day observation.

Purpose

There is no point in conducting a survey of information needs for its own sake; the only point in doing so is to collect data which can be used for the improvement of information systems, or for the design of new ones. In framing our questions, therefore, we had in mind certain hypotheses we wanted to test, and certain basic questions which seemed to us essential for information systems design. For example, did the basic pattern of information need divide according to discipline, or according to environment, or what? Were any patterns or trends detectable which could be associated with age, suggesting that the pattern of use and need was changing or likely to change in the near future? Did users have certain blockages or preferences which should be taken into account in designing information systems? What particular aspects of the formal system did they find difficult? What would happen if one created more abstracting journals—would they be used as well as, or in preference to, existing ones, or not at all? Should abstracting journals aim to be general and comprehensive, or specialized and smaller in size? Underlying all these questions, there was the basic question: what information does this person require for what he is doing, in what form, with what speed of delivery, etc?*

Characteristics of the sample

At the beginning of the questionnaire we asked a number of questions about each respondent, concerning his age group, seniority, length of experience in research, institution, qualifications, and so on. Analyses of these variables and characteristics against questions relating directly to information needs and uses were often revealing. We also asked their sex, but decided after all we were not particularly interested in sex, for analysis purposes, that is; differences between age groups can suggest changes in patterns of use, but there is very little one can do with sex, at least for the design of information systems. Incidentally, INFROSS has produced a very interesting body of data about the characteristics of social science researchers in the UK, quite apart from their information needs; it is possible, for example, to relate subject of research to subject of first degree, and so on.

Since one cannot ask very well what information a person needs without finding out what he is doing, we tried to find out exactly what people were involved in. We asked not only what the subject of a respondent's research project was, but how he was going about his research. This question proved too ambitious and difficult; we had hoped that respondents would be able to structure their answers in such a way that one could distinguish some basic patterns of research, but a fair number did not answer this question at all, and of those who did, the answers could certainly not be categorized into a limited number of basic patterns. There is a wealth of information in the answers to this question, which we were unable to put into a form that could be analysed by the MVC programs we used, but which still require and deserve study, since very little indeed is known about the research process in the social sciences. It was a great disappointment that we could not analyse it and relate it to the answers to other questions.

Types of information use

We asked three questions relating to materials used in research. The first concerned the *raw materials* of the respondents' research (archives, experiment or observation, interview or questionnaire, etc.); the second concerned the *types of information* they used (historical, statistical, etc.); the third asked about the

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* The thinking behind INFROSS is more fully explained in two published papers,[8,9] and in the Report on the Preliminary Stage.[10]

physical forms and other channels of information used (periodicals, monographs, theses, etc.). Their replies were related to their disciplines and environments, and indeed the three questions were related to one another in the analyses. In brief, what came out of these questions was that most raw materials, types of information, and channels are used by most categories; no particular discipline or environment has a monopoly, or anything near it, of any one type of raw material, type of information, or channel. Indeed, the answers to these three questions were analysed against the answers to all other questions in the questionnaire, and although certain patterns did emerge, as will be shown, in answer to some questions, our findings make it extremely doubtful whether any of these categorizations can be used as the basis for information systems design. From the user's point of view, that is; from a production point of view it may of course make very good sense to produce separate bibliographies for reports and theses, as happens at present. The weakness of relationships between the answers to these three questions and other questions was something of a surprise; extreme concentrations were not to be expected, but neither was the very wide scatter that resulted from our analyses.

Of the various types of information listed in the questionnaire, historical and descriptive information was least used (the examples given in the questionnaire to illustrate 'descriptive' were marriage ceremonies of an African tribe, and social life in a mining village); methodological and conceptual information was used by nearly all respondents, with psychologists being the heaviest users; while the fifth category, statistical information, was also used by almost everyone, being most used by economists, especially those in government departments.

The answers to the questions on use of physical forms and other channels were rather interesting; Table 1 summarizes our findings. The 3 per cent who never used monographs, and the 3 per cent who never used periodicals, are something of a mystery (they may represent merely misplaced ticks on the questionnaires). The high figures for non-use of microfilms, and of 'non-book materials' such as films, recorded sound and videotapes, are interesting. The disciplines of researchers making most use of each category present few surprises. Social scientists are still very print-oriented; some research projects appeared to call out for films or other non-book media, but they are very little used. One may perhaps expect this situation to change considerably in the next few years, as more material becomes available in these forms, and libraries make provision for its storage and use.

Respondents were asked which forms of information they used in their current research for each of the various types of information. Books and periodicals were used for all types. Of less common forms, government publications, newspapers, consultation with colleagues and conferences were associated with descriptive information; computer printout with statistical information; newspapers with historical information; computer printout and consultation with colleagues with methodological information; and consultation with colleagues, newspapers and government publications with conceptual information.

Methods of locating references to relevant published information

One question listed twelve methods (the twelfth being 'other') of discovering references to relevant published information; respondents were asked to rate them each according to usefulness. As can be seen from Table 2, a quarter never used abstracts or indexes, library catalogues, searching library shelves, or book reviews. Rather fewer individuals (about one-sixth) never consulted experts for this purpose, discussed with colleagues, or had discussions or correspondence with persons outside their own institution. Just under half never consulted librarians, and one-third never used specialized bibliographies. By far the most useful method was following up references in books and periodicals; 94 per cent of respondents found this method useful, and 59 per cent rated it as the most useful method.

TABLE 1: *Use of different information channels*

	CHANNEL	*Not using* (%)	*Using often* (%)	*Subject with highest % of 'often' markings*
PHYSICAL FORMS	Periodicals	3	57	Psychology*
	Books (monographs)	3	57	Anthropology
	Books (conference procs.)	13	32	Psychology*
	Research reports	21	28	Psychology*
	Theses	29	11	Education*
	Newspapers	36	16	Politics*
	Government publications	23	34	Economics*
	Microforms	74	3	History*
	Maps	63	10	Geography*
	Films (pictorial)	93	1	– -
	Other pictorial	76	2	Anthr. & Geog.*
	Sound recordings	85	4	Education
	Video-tape	97	1	–
	Computer printout	62	21	Statistics*
INFORMAL CHANNELS	Radio or TV	78	1	–
	Conferences	41	8	Statistics*
	Colleagues in own institution	15	26	Psychol. & Stats.
	Colleagues or experts elsewhere	16	26	Sociology

* Indicates a much higher no. of 'often' markings than other subjects.
Replies were grouped into four categories; the middle two are omitted in this table.

The low use of librarians for this purpose is perhaps not a surprise. What is rather a shock is that the more senior individuals were more likely to find librarians of little or no use. Dr Johnson once made a wisecrack about a man's second marriage, to the effect that it was the triumph of hope over experience; perhaps the low use of librarians by professors represents the triumph of experience over hope. (Maybe, however, it is independence and lack of humility that make both for non-use of librarians and for advancement to professorial status!) Respondents in colleges of education did tend to use librarians much more than other respondents; this may be attributable to the intimacy of the college library and the closer personal contact college librarians are usually able to have with their clientele. It may also be partly attributable to the incompetence of college of education staff in finding out things for themselves; it was noticeable in several analyses that they were even less good at using the information system than their opposite numbers in universities and research institutions.

Views on librarians were expressed by some respondents in a rather freer form than this particular question permitted. One said: 'Do away with librarians —spend the money on more books!'; another thought 'Librarians seem to be, generally, *oblivious* of researchers' problems.' Against these can be set the person who considered an 'intelligent librarian better than a computer-based retrieval system'.

Statisticians were low on their use of most methods. Psychologists used abstracts and indexes much more than most, 63 per cent rating them as very useful; they also used librarians very little indeed. As one might expect, heavy users of print media (books, etc.) used abstracts and indexes a lot, light users used bibliographical tools a good deal less. There was no difference in the use of bibliographical tools by users of non-book materials and of informal methods. One separate question was devoted to the ways people used of finding out about non-book materials, if they used them at all, since there are few guides as yet to these materials*: personal contact was the most common method mentioned.

TABLE 2: *Usefulness of methods of locating references for primary research interest*

METHOD	USEFULNESS % of respondents *not used*	 *very useful*
Abstracts or indexes	22	32
Consulting expert	16	34
Discussion with colleagues internally	13	27
Discussion with persons elsewhere	17	23
Library catalogues	22	22
Searching own library shelves	23	18
Searching other library shelves	34	16
Consulting librarian	48	8
Specialist bibliographies	35	23
Bibliographies or references in books or journals	6	59
Book reviews	23	17

N.B. Replies were grouped into four categories of usefulness: the middle two are omitted in this table.

Use of abstracting and indexing journals

Respondents were asked to list the abstracting and indexing journals they used for their current research. Deliberately, a list of journals was not given, since we thought this would tempt respondents to mark tools they had heard of but never used. The open question carried the risk that respondents would forget some they had actually used, but they were unlikely to forget any they had used to any extent. In fact, several new abstracting and indexing journals, unknown to librarians or anyone else, were invented by respondents, some of them sounding quite useful, as well as some new primary journals; it is evident that by no means all of our respondents knew what an abstracting and indexing journal was.

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* At least, there were at the time of the questionnaire; the National Council for Educational Technology is rapidly remedying this situation now.

65 per cent of the sample mentioned only one abstracting and indexing service (that is, one *identifiable* service—inventions were not included in the analyses). 16 per cent mentioned two, 11 percent three, and 8 per cent four or more (1 per cent as many as seven). Since material relevant to most of the social sciences tends to be widely scattered in the primary literature, and therefore in the secondary services, the fact that nearly two-thirds used only one service is striking, though not surprising; the average number used was 1.7. Certainly the findings suggest that new services should not be created without very careful thought. An analysis of type of information against use of abstracting and indexing services revealed little relationship.

TABLE 3: *Use of abstracting and indexing services*

SERVICE	*Total no. of users*	*No. of users within discipline*	*No. of potential users in sample*	*Within-discipline users as % of potential users*
Aslib *Index to Theses*	25	–	?	–
Brit. Educ. Index	29	23	243	9
Current Sociology	17	12	408	3
Dissertation Abstracts	23	–	?	–
Economic Abstracts	18	15	348	4
Education Index	21	16	243	7
Geographical Abstracts	55	49	103	48
Index to Economic Jnls.	35	30	348	9
Int. Bibl. Soc. Sci. (Anthrop.)	5	2	33	6
Int. Bibl. Soc. Sci. (Econ.)	10	6	348	2
Int. Bibl. Soc. Sci. (Pol.)	11	8	186	4
Int. Bibl. Soc. Sci. (Sociol.)	9	4	408	1
Int. Pol. Sci. Abs.	15	14	186	8
J. Econ. Abstracts	61	53	348	15
Psychological Abstracts	133	96	225	43
Science Citation Index	7	–	?	–
Social Science & Humanities Index	22	–	?	–
Sociological Abstracts	107	65	408	16
Sociology of Educ. Abs.	25	13	40	32

The individual tools thought most likely to be used were coded separately; in the event, some of these proved to receive very little use indeed. Table 3 shows the numbers mentioning each service, and gives 'within-subject' users as a percentage of the potential number of users. These percentages must be used with great caution, since it is very hard to say exactly who are potential users of *Sociological Abstracts*; the base for the percentage in the table is in fact those persons identified in the analysis as sociologists, but *Sociological Abstracts* is of use to more than sociologists, and in fact some non-sociologists did use it. The only three services that came out really well are *Psychological Abstracts, Geographical Abstracts,* and *Sociology of Education Abstracts.* The first and second of these are probably the most comprehensive of abstracting services in the social sciences; the last is the best example of an abstracting service in the social sciences covering a limited area. This seems to suggest that where there is a good abstracting service, whether in a broad or narrow area, it will be used. Psychology and geography are, however, among the 'hard' social sciences, and this comparatively heavy use of abstracts and indexes is one of several aspects of information use where they are more akin to the sciences than other disciplines in the sample. The sociological and economics abstracting journals are also good, but were not used to anything like the same extent.

Respondents were asked to rate abstracts, as opposed to simple author-and-title entries, when assessing the relevance of references. There was a strong preference for abstracts (stronger than has appeared in science user studies), those who used abstracts most having the strongest preferences. A small number considered that author-and-title entries were *better* than abstracts; this was not an error in their marking of the questionnaire, as we had not thought to include this category for marking—they wrote it in themselves.

It was believed when designing the questionnaire that the terminological difficulties in the social sciences would cause problems in the use of abstracting and indexing journals for users when searching for subject entries. 30 per cent of those who did find difficulty marked the category indicating that they found it difficult to put into convenient terms their subjects or concepts, and 33 per cent could not easily find the terms the indexer had used for these subjects or concepts. Sociologists found most difficulty. Those respondents who used informal methods of obtaining references were most likely to find difficulty with abstracting and indexing journals, presumably because of their unfamiliarity. A different question asked about difficulties or inconveniences in using services they had listed; the most common comments concerned layout, and quality of indexes.

The last word on abstracting and indexing services can perhaps be left with one of our respondents. When asked at the end of the questionnaire whether he had suggestions for the improvement of the information system, he replied 'Anything you like, but *not* yet another abstract'.

A citation index in the social sciences?

One of the most interesting findings in the whole questionnaire came from the answers to a question concerning citation indexes. A brief explanation was given of how a citation index worked, and respondents were asked to rate such a tool according to its potential usefulness to their research. Over half replied that such an index would be very useful, and only 5 per cent that it would be of no use at all. Answers to this question must be treated with caution, since it is hard to know whether all respondents understood fully what was meant by a citation index, and even harder to know whether they would actually use one if it were provided. However, the replies do suggest that a citation index is well worth trying. The theoretical advantages over conventional tools are even greater than in the sciences; the terminology in the social sciences is 'softer', the structure of knowledge is less stable (resulting in problems in arranging the contents of abstracting journals according to a classified arrangement), and the scatter of relevant material across primary journals is probably greater. An experiment with a citation index in the social sciences seems long overdue.

Use of library catalogues and bibliographies

Of those who replied to a question asking respondents to list library catalogues and published bibliographies they had used, 39 per cent did not list any library catalogues at all, though it is impossible from the wording of the question to be sure whether they had actually entirely escaped using library catalogues for their current research. 41 per cent mentioned special bibliographies they had used. These two types of tool are the main means of access to monographs, as opposed to periodical literature, and their low use is rather surprising. A possible explanation is that in their own special field of research, respondents would expect to know the relevant monograph literature, and not need to search specially for it. Perhaps they had also been responsible for ordering books for the library in their subject, and therefore did not need to use the catalogues (though how they found them on the shelves without using the catalogues is something of a mystery). The question on the usefulness, limitations, etc. of printed bibliographies and catalogues did not yield very useful results. However, it is worth noting that 47 per cent of users who commented on library catalogues thought the extent of detail in them was too little. It would be most interesting to know what extra detail they wanted. This question, incidentally, illustrates the difficulties of asking users about existing information tools; they are unable to envisage easily how they might be improved, and having no criteria against which to judge, their criticisms are often rather feeble, not to say naïve.

Users of the British Museum Library sometimes had strong words to say about its catalogue, without, however, being very specific. 'Up-to-date cataloguing system needed' and 'Even if it costs thousands, the BM catalogue *must* be simplified and improved' are not really very helpful comments. One or two people suggested that libraries should have title catalogues, and one wanted a chronological index, by subject.

Book indexes

A question about book indexes again was not very revealing. 40 per cent said they had experienced no difficulty in using indexes; 23 per cent said that indexes were often insufficiently comprehensive, and a further 25 per cent found this was occasionally so. 15 per cent found poor choice of terms or poor arrangement common problems, and 25 per cent found them occasional problems. By far the most popular suggestion for improvement was for bigger and more comprehensive indexes. The answers to this question, incidentally, proved conclusively that there was no collusion between our respondents; 23 said that indexes should be prepared by professional indexers rather than authors, and 24 said that indexes should be prepared by authors rather than professional indexers.

Volumes personally owned

Respondents were asked how many volumes directly related to their current research they owned personally. Obviously their estimates could only be rough ones—we did not actually ask them to count their collections. The most interesting results of this question were that those who had the smallest collections were those who used formal methods of obtaining references least, and those who owned most volumes were the heaviest users of libraries. This bears out the results of other surveys, which suggest that there are book-users and non book-users—it is not a case of compensating for poor libraries by buying books, or vice versa, people tend both to buy books *and* use libraries, or neither.

37 per cent of respondents owned less than ten volumes, and just over one third owned over twenty-five. Geographers, perhaps oddly, were more likely to own a lot of books than researchers in the other disciplines; 22 per cent of them owned more than fifty volumes, and 12 per cent more than one hundred. Political scientists too tended to own more volumes than others; 14 per cent more than one hundred but, on the other hand, 27 per cent owned fewer than ten.

Use of libraries

One question concerned the use of books—whether respondents generally needed to use them in conjunction with one another, or whether it was equally satisfactory to have them available consecutively. The point of this question was that if consecutive availability is adequate most of the time, inter-library lending and closed access systems are much more likely to be satisfactory than if books are frequently needed in conjunction with one another, when large open access collections would appear to be much more suitable. In fact, respondents were about equally divided. The 'harder' disciplines—geography, psychology and statistics—were more likely to use books consecutively, while anthropologists and sociologists were more likely to use them in conjunction.

More interesting is the number of libraries used by researchers. 3 per cent said they used none; at the other extreme, 11 per cent used, or had used, six or more in connection with their current research. The older, more senior and more experienced researchers tended to use *fewer* libraries than others; this may be an indication of mobility decreasing with age. Statisticians (of whom there were not many in the sample) used fewest libraries, psychologists next fewest. Among the heaviest users were historians, political scientists and geographers. Use of libraries was largely unrelated to the type of information required, and the physical forms used.

The adequacy of local bookstock was the subject of another question. Only 4 per cent found the local bookstock adequate for all their requirements, 33 per cent for most, 36 per cent for some, 24 per cent for few, and 3 per cent for none. Respondents from Oxbridge and government departments were most likely to find their local bookstock adequate, followed by respondents from Scottish universities and independent research institutions. There was a positive association between age of respondents and estimated adequacy; evidently, the older researchers get, the more easily they are satisfied. Those wanting methodological and conceptual information were most easily satisfied, those wanting historical and descriptive information least likely to find the local bookstock adequate.

Comments made on libraries mainly concerned inadequate money and resources. There were the usual heartfelt cries about classification schemes ('I hate battling with library classification systems', 'Abolish Dewey'), and requests for better interlending were common. A few evidently thought libraries too inward-looking and too little oriented towards the user.

Age of books required

90 per cent of the total sample made use of pre-1945 material; 6 per cent made use of pre-1800 material. Researchers in statistics, economics and education made the least use of pre-1945 material; the heaviest users of pre-1800 material were in history, geography and anthropology. As for types of information required, there was a positive relationship between use of older books and historical material, a negative relationship with statistical material, and no relationship at all with methodological and conceptual material. The more volumes owned by a person, the more likely he was to use older books.

Keeping up with current publications

At the time the questionnaire was circulated, there were no published current awareness tools in the social sciences such as have appeared since in education, psychology, sociology and management, and economics. Their existence would presumably (or should) have affected profoundly the answers to our questions about keeping up with current publications relevant to the respondent's research. It would be most useful to know how the coming of these new services has affected information uses.

The most popular method of keeping up was abstracting and indexing periodicals, mentioned by 40 per cent. The next most popular method was personal communication with individuals (19 per cent), followed by browsing in bookshops and consulting book reviews (each 13 per cent). Very little mention was made of review articles or of printed bibliographies such as BNB. Greatest use of abstracting and indexing periodicals for this purpose was made by researchers in geography, psychology and education.

84 per cent considered it moderately or very important to know very soon after publication what was being published; only 15 per cent considered it not very important. The least demanding disciplines were anthropology, history and statistics. There was no relation between the answers to this question and use of historical or descriptive material, but users of statistical, methodological, and conceptual material tended to demand speedy notification.

Answers to questions about what sort of delay is tolerable between publication and appearance in an indexing or abstracting journal are to be regarded with some caution, since they are almost bound to be conditioned partly by expectations; people do not usually ask for what they consider to be unreasonable or impossible (a Victorian would not have been able to make a very sensible answer to a question whether he wanted to cross the Atlantic in a few hours). Nevertheless, it is still of interest to look at the answers to this question. 11 per cent were willing to wait a year or more; at the other extreme, 8 per cent thought a delay of up to one month was tolerable, and 29 per cent a delay of between one and three months. Psychologists were most demanding, followed by researchers in education; next came geographers, economists, sociologists, political scientists, and, last, anthropologists and historians. Users of methodological and historical information were least anxious to have speedy appearance in abstracting journals. Applied researchers were most demanding, followed by experimental researchers. Those who used a number of abstracting journals tended to tolerate less delay than those who used only one. This suggests again that there is an eager-beaver type of researcher (indeed, I sometimes wonder whether information users cannot be divided broadly into hunters and grazers; there may even be a third category, a highly domesticated species that stays at home and waits to be fed).

Keeping track of current research in progress

Some researchers did not bother to keep track of current research at all. The most common method of keeping track was some form of personal or informal contact; 37 per cent of mentions were of informal methods of one kind or another, compared with 18 per cent of formal methods, such as research registers. There was little difference between subjects in answers to this question. Problems mentioned by respondents were, in order of frequency of mention, lack of published information about ongoing research, incomplete or out-of-date research registers, difficulty of tracing research in other countries, time involved in tracing research, non-co-operation from other workers, mass of material too great to work through, no central indexing or abstracting services for research in progress, difficulty of physical access to material, and field of research too small to warrant time spent in tracking it down. Researchers in government departments and technological universities mentioned many more problems than researchers in other environments.

Perhaps not surprisingly, respondents tended to use similar means for keeping track of currently published material and of research in progress. Those who kept track of research in progress were particularly active in the use of informal methods.

Language problems

I do not propose to deal with this in detail here, as a meeting is planned later in the year on the foreign language problem in the social sciences, based on the results of the Sheffield survey[11] and on INFROSS. In brief, 18 per cent of the sample read English only; 75 per cent read French, 27 per cent German, and 22 per cent both; 4 per cent Russian; and 14 per cent a Romance language other than French. However, only one-third of the individuals able to read a language regularly scanned literature in that language. There was considerable reluctance to pursue articles even in languages respondents could read, while in languages they did not read, very little effort was made to follow up relevant items. It does appear from the Sheffield University study of the foreign language barrier, as well as from INFROSS, that there is a serious foreign language problem in the social sciences.

Stimulus for ideas

Information can serve as a stimulus or source of new ideas, as well as serving the more usual functions. Respondents were asked to rate various possible activities as stimuli. Of these, the user's own research had the highest rating, followed (on a rapidly declining scale) by reading, discussions with colleagues, and teaching; conferences were rated lowest.

Delegation of searching

Respondents were asked about the extent to which they delegated searching at present, and the extent to which they would be willing to delegate to a hypothetical information officer. At present, delegation seems to be rare; only 7 per cent delegated extensively, and 72 per cent did not delegate at all, though the older and more senior respondents were more likely to delegate (only 43 per cent of professors did not delegate at all). Researchers in non-university environments delegated far more than those in universities, presumably because library and information services are usually more positive and developed in these places. When asked about their willingness to delegate, however, the answers of respondents were totally different. Only 12 per cent stated that they would not be willing to delegate at all, the remainder of respondents being about equally divided between those who were willing to delegate extensively and those who were willing to delegate partially. Reasons given for unwillingness to delegate included the views that no one other than the researcher was competent to do the searching, that it was difficult to formulate precise instructions, that the serendipity value of searching would be lost, and that a particular subject area was so small as to make delegation unnecessary. Those involved in applied or experimental research were more willing to delegate; users of theoretical or historical material were least willing. One might suppose that those who wanted factual material—e.g. statistics—would find it much easier to delegate than those who wanted theoretical or conceptual material, and this was in general the case, but researchers in education and sociology were most willing of all to delegate, and neither of these disciplines can be said to be entirely concerned with hard data. Those researchers who were most anxious for speedy notification were most ready to delegate.

Of those who stated that they would be willing to delegate partially, 73 per cent did not actually delegate at all at the time of the questionnaire; of those who were willing to delegate extensively, 61 per cent did not do so. If information officers were available on the required scale, and respondents did what they actually said they were willing to do, there would obviously be major and fundamental changes in their information habits. What we do not know is whether this willingness would be a wholehearted one, or forced on them through shortage of time and other extraneous factors. However, even if this is so, it does not invalidate the willingness of researchers to delegate, nor the value of information officers if they were available. Our Experimental Information Officer at Bath commented that delegators have tended to fall into two groups: those who want searching done in their main area of research, to ensure that no relevant references were missed; and those who are willing to delegate searching in marginal areas only, areas which they cannot cover themselves. Also, she has found researchers more willing to delegate retrospective searching than current searching, partly, I imagine, because retrospective searches are a much bigger job, and not nearly so much fun as keeping up with current literature.

I would hesitate to claim this as the most significant finding of INFROSS, but it is certainly one of the most interesting in its implications. If extensive delegation to information officers were the general practice, the whole design of information systems would be fundamentally affected. At present, information systems are designed, if not for easy use by researchers, at least with their usage in mind. This prevents their development beyond a certain level of complexity and sophistication, though even so some bibliographical tools are by no means easy to use. If, however, one could assume an intermediary always between the information and the user, information systems could be developed to almost any level of complexity; the enormous constraint of ready usability would cease to exist, and this should make it possible for far more efficient and effective retrieval systems to be developed. Indeed, I would go so far as to say that until this question of the intermediary is settled one way or the other, it is extremely hard to know where to go in the development of information systems.

One final word on information officers may be desirable. We noted earlier that the use of librarians was minimal. This contrasts very sharply with willingness to delegate to someone called an information officer. Perhaps if we all changed our names we would smell a little sweeter. To one of our respondents, at least, there would be a serious snag in delegation: he said, 'much of my pleasure in research is gained from the search for the material. Last summer I covered about 500 miles. . . .'

Late detection of information

The phenomenon of late detection is a difficult one to interpret. Admission of late detection can indicate either conscientiousness or laziness. The conscientious information hunter is likely to come across so much information that some of it is almost bound to be late; at the other extreme, the passive grazer, while likely to receive much less information altogether, is bound, at times, to discover too late information he could have found in time if he had been assiduous. In the first case, the system may be held largely to blame; in the second, the researcher has no one to blame but himself. In any case, lateness is relative and subjective; what is late for a psychologist may not be late for a historian. 78 per cent of our respondents stated that they frequently came across information too late to be of use to them, 68 per cent occasionally, and 26 per cent never. Respondents at colleges of education were the least likely to experience it, presumably because of their inadequate exposure to information sources. Heavy users of the less commonly used physical forms of information—research reports, theses, government publications, etc.—were more likely to find information too late (presumably because these tend to appear later in secondary tools), as were those who used the formal information system heavily, and those who most wanted speedy notification of new publications. The penalties for late detection in the social sciences are a good deal less than in science and technology, where, for example, ignorance of a relevant article on a researcher's special subject can make all the difference to the value of a piece of research, quite apart from the question of priority of discovery.

Use of informal channels

The use made of informal channels, as shown by answers to questions in our questionnaire, is quite heavy, and even so it is probably underestimated; as I suggested earlier, it is much easier to remember identifiable information uses involving the formal system than it is to remember discussions and information transferred in other informal ways. Most of our respondents discussed their work with colleagues in their own institutions, and in other institutions also. As has already been seen, informal channels were quite commonly used for locating relevant references, for keeping abreast of new publications, and for keeping up with current research. It is impossible to assess from INFROSS the *relative* importance of formal and informal channels; indeed, it is impossible to assess the actual acts of communication performed through the various channels.

There were remarkably few relationships revealed by analysing use of informal channels against other answers to the questionnaire. Use of informal channels appears to be unrelated to status, age, discipline, and even to extent of use of formal systems. There were some environmental differences; researchers in government institutions were most likely to use informal channels, those in colleges of education least likely. Also, the bigger the team, the more likely the researcher was to discuss his work with his colleagues—this is hardly surprising. There were, however, considerable variations in the answers to questions relating to informal channels, and it would seem most probable that the decisive factors are related to personality. While the personality characteristics of researchers would be fascinating to explore, unfortunately there is very little one can do with the knowledge when one has obtained it; one can hardly devise different sorts of information systems for different personalities.

Conferences seemed to be of less information value than one might have expected. In general, they proved to be of marginal rather than of central relevance, and perhaps surprisingly, formal papers were considered as useful as informal discussion. This does not support the common view that what is really important at a conference is the discussion at the bar, the only function of formal papers being to provide justification for attendance and for claiming expenses. The conflict between the accepted view and the findings of INFROSS may be apparent rather than real; information gained at the bar may indeed be important and extremely interesting, but, in my own experience at least, one cannot always claim it as relevant to one's immediate research. I certainly know no better way of finding out about other researchers, whether by what they say or by what other people say about them.

The informal system, or non-system, is something of a problem. It is heavily used, and preferred for some purposes. Would certain parts of it benefit by being transferred to the formal system, or by being better organized? Or is it precisely the informality of informal communication that makes it attractive? If so, any attempt to formalize or organize it would result in its being less used, and so defeat its object. Informal communication takes place anyway, and will continue to take place; it is fun, which is more than can be said of many formal bibliographical tools.

Special information problems

We asked whether any information problems of special difficulty or importance had arisen during the current research of the respondent. Much the most common special problem mentioned was physical access to, and availability of, information, published and unpublished. A large number of other problems was mentioned, but none of them was mentioned by more than a few individuals. College of education researchers were least likely to mention problems; again, this seemed to be an indication of their limited horizons. Theoretical researchers did not have much to say in answer to this question, probably because much theoretical work depends on hard independent thinking, rather than on utilizing the work of others. Of the various disciplines, geography seemed to have the most problems, psychology least.

Respondents were also asked whether they were able to solve the problems they listed, and to what extent. Only 3 per cent said that they had solved them to their full satisfaction as quickly as desired; a further 8 per cent had fully solved them, but less quickly than desired; 57 per cent had only partially solved their problems, and 22 per cent had found no solution at all. This adds up to a large number of unsolved and partially solved problems, but the information system may not be to blame for all of these—some of the problems may simply be insoluble, in the sense that the relevant information has simply never been created.

It is important to bear in mind when interpreting this part of the results of INFROSS that questions of this kind tend inevitably to study persons' *awareness* of problems rather than the *existence* of problems. This is not of course to say that the problems mentioned did not exist, but many which were just as real may simply not have arisen to the consciousness of some respondents; just as a real madman is usually unaware he is mad, so those who had the worst problems may have been least conscious of them. During interviews, gentle probing often uncovered some problems which researchers recognized at once as problems, once they were identified; in fact, I suppose we induced information neuroses in not a few.

Teaching needs

The final section of the questionnaire concerned information needs in teaching, as opposed to research. We did not set out to capture teachers as teachers, although our sample did in fact include some who were not doing any research at all, only teaching. However, this last part of the questionnaire enabled us to compare information needs in teaching and in research within the same individuals, as it were. In fact, they proved not to be very different, though there were some different emphases. What did appear was the interrelationship between teaching and research, in the sense that in hunting for information relevant to their research, individuals often came across information relevant to their teaching, and vice versa. Library bookstocks tended to be rather more adequate for teaching needs than for research needs, but this is not surprising.

Suggestions for improvement

Those who survived to the end of the questionnaire were given the chance to make suggestions for improvement in the information system. Several wheels were re-invented, and some new square ones were proposed; not that we expected any brilliant new solutions to long-standing problems. Steam was let off, most commonly in the form of 'Too much rubbish being published', 'Too much information around'. Social scientists see the information world very much as revolving around their own interests; one wanted an abstracting service in Islamic history, while another wanted an agency for abstracting and indexing in English all articles in Irish, Gaelic, Welsh, Manx and Breton.

Practitioners

As I mentioned near the beginning of this paper, we did not confine our investigation entirely to academic researchers. We interviewed a considerable number of people involved in research in government departments—a different kind of research from that normally conducted in universities, in that the work consisted of day-to-day research rather than large research projects. We also interviewed college of education lecturers and schoolteachers, and social workers. Those who wish to read what we have to say about these categories of social scientists are referred to our separate reports on these parts of our investigation. Since the findings were based on small, non-random samples, they cannot claim any general validity, but I hold to my view that a more extensive investigation would not reveal a very different picture.

In general, practitioners, whether in teaching or in social work, have in common a shortage of time, and a general unawareness of information tools. Where they differ is in their awareness of an information problem, their admission of a need to be informed. Social workers had (or developed during our interviews) a sort of information conscience; they were only too aware of a vast body of potentially relevant research which they were unable to tap. Teachers, on the other hand, where they were not plain apathetic, showed some suspicion, even hostility, towards educational research; they saw the need to keep up with the subjects they taught, not with educational theory, research and practice. Education was to them something one did, not something one found out about.

Some information needs—for example, for factual information concerning social legislation—are relatively straightforward, though not always solved: a more generous availability of existing reference works, and a greater awareness of the services local public libraries can give, would solve most of them. Keeping up with current practical trends present more problems, partly because some of the information is not readily available in documentary form. The greatest difficulty concerns research information. It is of little use to convey 'raw' research to practitioners in the form of journal articles and research papers; what they need is carefully prepared and temptingly presented packages, summarizing and evaluating research findings that are sufficiently established for their practical implications to be clear. Since practitioners have an even stronger preference for informal communication than researchers—after all, informal communication is precisely what teachers and social workers are involved in during their everyday work—thought should also be given to developing channels of informal communication, whether these be closer contacts with local institutions of higher education, or access to a central or regional information centre, perhaps based on a professional association. In the next stage, we hope to experiment with varying solutions to the problems of practitioners. Perhaps far too much effort has been devoted in the past to serving researchers (who use the services to produce further information, which is served up to other researchers, who use the services . . .), and far too little to serving the practitioners who are after all serving the community much more directly and obviously.

Conclusions

Can any general conclusion be drawn from INFROSS? No brief summary can be made of its findings; I have found it very difficult to extract in a coherent form even those few findings presented here, and to select further would risk introducing considerable distortion. Certainly, no thumbnail sketch can be drawn from INFROSS of the social scientist as an information user. Recently we have attempted to compare the findings of INFROSS with those of science user studies, but we have met with two almost insuperable difficulties—the inability to extract from the mass of non-comparable science user studies any sort of coherent picture of the science user, and the impossibility of establishing any consistent general patterns of social science users from INFROSS. At least, we can be fairly sure that the differences we have found between, for example, subjects and environments, are genuine differences, not due, as perhaps in science, to differences in samples, questions, environments, etc. It is one of the great strengths of INFROSS that it does provide a mass of *comparable* data within a very broad field, so that every finding can be related to other findings; it is of very little use to know that 75 per cent of sociologists do something, unless one has some idea what other people do.

No major patterns were detected which could be of use for information system design purposes. The obvious way to organize formal services is still by subject, simply because the primary literature is organized that way. But this still leaves open how big a 'subject' should be, and how it can be related to other 'subjects'. Research we are currently involved in should help us to establish subject boundaries rather better than has been done in the past, but the interrelatedness of subjects is abundantly clear from INFROSS.

One thing that does emerge from INFROSS, I think, is that the social scientist as an information user is at a point along a continuum, from 'hard' to 'soft' social science. The 'hard' social scientist exhibits a number of characteristics that have been found in science user studies, and is distinguishable in a number of ways from the 'softer' social scientist. The experimental psychologist and the econometrician are at opposite poles from the sociological and educational theorist—I hope sociological and educational theorists will forgive me if I say that one can hardly get softer than that. One is tempted to suggest that the 'soft' social sciences are more akin to the humanities, but in fact some of the humanities are reasonably 'hard'; at least history and literature are concerned with historical data and documents, and with literary texts, whatever interpretation may be placed on them. The nearest disciplines to social science theory would appear to be philosophy and theology; the attempt to impose some kind of order on ideas and on God is really quite close to the attempt to impose conceptual structures on human beings and their interactions. What they have in common is that the matter being studied shifts while it is being studied, and, at its most extreme, may itself be a product of the study. It might be said that the subject matter exists mainly or solely in the mind of the researcher.

The major deficiencies in the formal system at present appear to be the lack, in general, of review articles, translation services, and services oriented to the practitioner. To these may be added the underdeveloped state of information services, whether personal (information officer) or impersonal (organized SDI). The major deficiencies in the *operation* of the present system are due to unawareness (of relevant services), to under-use (of formal services and of librarians), and to shortage of time and insufficient motivation on the part of users.

This is not the place to consider the implications of INFROSS for the design of information systems; indeed, this is part of the research we are now conducting. However, as a librarian, speaking mainly to librarians, I might perhaps conclude with some of the possible implications of INFROSS for libraries. First, the local satisfaction level of libraries appears to be rather low in many cases; this will come as no surprise to librarians. Also, some social scientists at least tend to use books together rather than consecutively, and this has implications for the storage and arrangement of books in libraries. Availability, of stock and services, appears to have a considerable effect on demand and use; researchers in government departments and in colleges of education are at opposite poles in a number of ways, the former being particularly well served but also very demanding. Library staff are at present considerably under-used; a good many problems of the social scientist could be quickly and easily solved if they would only consult librarians, but this is one of the last things they are likely to do. On the other hand, they appear to look very kindly on the idea of information officers. Formal bibliographical tools, including abstracting and indexing services, also appear to be under-used; at least, there appears to be no great eagerness on the part of social scientists to use them regularly. Where they do use them, it is for current awareness rather than for searching. The customary answer to this is education of the user, but I doubt the effectiveness of this; I think most researchers have much more interesting things to do than use abstracting and indexing services, and great efforts would be required to persuade them to use them more heavily. The same applies to library catalogues and specialized bibliographies. Perhaps this is where the information officer could come in again; if they need to use these tools, but do not use them, perhaps someone should use them on their behalf. I hope I am not plugging my own view too strongly when I say that a good deal of the findings of INFROSS, as indeed of other user studies, seem to point strongly to the need for personal intermediaries. With a large and complex body of knowledge on the one hand, and on the other a user who needs the information but has insufficient time and limited know-how, some means of linkage between the two must be designed. If you bring the tools down to the user, you may make them ineffective, while attempts to take the user up to the tools have not been outstandingly successful.

INFROSS must have been one of the largest user investigations ever carried out. As the generator of INFROSS, I feel a mixture of guilt and gratitude, to the numerous social scientists who filled in the very lengthy questionnaire or submitted to interviews, and towards the various people who have helped in processing the results. In fact, I see myself as a rather dirty shop window behind which can be seen at a distance the goods provided and arranged by my research team, Michael Brittain in particular. If you want to see the real goods, you must go inside the shop, and read the various reports produced and presented to OSTI. For those who do not care to rummage round a very large collection of wares, Michael Brittain, Frank Cranmer and myself hope later in the year to write a book presenting the results of INFROSS in extended form fit for human consumption.

ADDENDUM

The section below is part of the overview of INFROSS, but was not included in the original presentation. It is included here for the sake of completeness.

Accidental Discovery

Accidental discovery is a phenomenon with which most researchers are familiar, but which is hard to quantify and harder to evaluate. It is of some importance to attempt to do so, as it affects system design in a number of ways; most information systems, insofar as they are designed at all, tend to aim at precision and the elimination of 'noise', and it needs to asked whether some facilities for 'accident' should be, if not deliberately built in, at any rate not entirely excluded. Few of the INFROSS sample did not report some accidental discovery.

Scanning current periodicals was the commonest method of making accidental discoveries (46 per cent said this happened often, only 10 per cent rarely or never), followed closely by spotting a relevant reference while looking up something else (38 per cent often, 12 per cent rarely or never). The third commonest method was conversation with colleagues (25 per cent often, 20 per cent rarely or never), and then came library browsing (20 per cent often, 30 per cent rarely or never). Other methods, such as browsing in bookshops or receiving offprints, were far less common.

Relatively few respondents answered the question about the importance to their research of material discovered accidentally. Their replies suggest that it is about equally common to find material of direct, marginal, and indirect importance, and a good deal commoner to find material which is not relevant to the research immediately in hand, but within general range of research interests.

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DISCUSSION

RALPH ADAM (The City University): 'I notice that in one of the research reports (no. 2), the INFROSS team point out that, for various reasons, social scientists in industry were excluded from the study. Could you please give us some idea of what your reasons were? Do you not feel that useful comparative data might be revealed by such a study, as social scientists in industry are probably exposed to more developed information services?'

MR LINE: 'We would have liked, and did originally intend, to include social scientists in industry; comparisons with other social scientists would have been useful. But we had to cut our losses somehow—we ran out of time as it was, and merely constructing a sampling frame for industrial social scientists, let alone interviewing them, would have been a very big task.'

RALPH ADAM: 'How specialized do you think an information officer in the social sciences should be? Do you feel, for instance, that in order to provide an effective service and also to be accepted by his clients, a social science information officer should have comparable qualifications to them?'

MR LINE: 'Ideally, an information officer should have detailed subject knowledge in the area he is serving; but a motivation to serve users, a knowledge of the information world, experience and, above all, personality, are all needed, and in combination can outweigh lack of subject knowledge.'

ALAN GILCHRIST (Aslib): 'Was there any suggestion of a specification for the information officers which would indicate their difference from librarians?'

MR LINE: 'The questionnaire did not give them the chance to provide one.'

MARTIN WRIGHT (Institute of Criminology, Cambridge): 'Mr Line mentioned some users' complaints about library classification schemes; yet one hears it suggested that classification is impossible in the social sciences. There must be some answer to this conflict. The books have got to be arranged in some order on the shelves, so it might as well be a helpful one. And as regards the catalogue, it would seem that precisely because the subject is difficult to classify, it would be useful to have an alternative approach, by subject as opposed to the alphabetical. Further, Mr Line seemed surprised that some people wanted the index to be arranged chronologically under subject, but is this not a convenient method, so that one can find, for example, the latest material on a particular topic?'

MR LINE: 'Social science library classification is rather outside the scope of INFROSS, and is such a big subject I would rather not get involved in it here. Chronological indexes *within* subjects can be useful, but I am not sure our respondent meant that.'

MRS L. FRASER (Unilever): 'In the course of the project, have you discovered any private or semi-private current-awareness services in the social sciences (especially in economics and statistics)?'

MR LINE: 'No, the questionnaire did not allow scope for this, and no particular service came up in interviews; perhaps because there are none, or very few.'

A. E. STANDLEY (West London College): (1) 'Did the social science areas investigated include Law?' (2) 'Did the data show any difference between "hunters" and "grazers" according to type of research ordinarily done by people sampled?'

MR LINE: (1) 'No, because it was a huge area with very special problems—and we had to exclude something!' (2) 'Not really: the "hunting" and "grazing" factors are really compounded of the answers to several questions, and therefore are not easy to analyse against other questions. What we did find was that those who were active in one form of information use were usually active in others—it was not usually a case of doing one thing or another, but both or neither.'

L. D. WILL (The City University): (1) 'Have you investigated the kind of research groups in which your respondents worked, in relation to the communication processes both within the group and between the group and outside? In particular, was any indication found of the existence of "technological gatekeepers" as found in other fields?' (2) 'Did you ask whether any of your respondents had had any instruction in the use of information sources, or whether they felt the need for such instruction?'

MR LINE: (1) 'We did ask, and coded, the size of research teams, and one or two interesting correlations did appear. We did not attempt to study "gatekeepers", though this would be an interesting enquiry.' (2) 'This would have been a useful and interesting question—but we had too many questions as it was, and this was one of the questions that had to go.'

J. LAND (Polytechnic of North London School of Librarianship): 'Were details of place of original degree asked for in the questionnaire?'

MR LINE: 'Subject and level of degrees were asked, but not place.'

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

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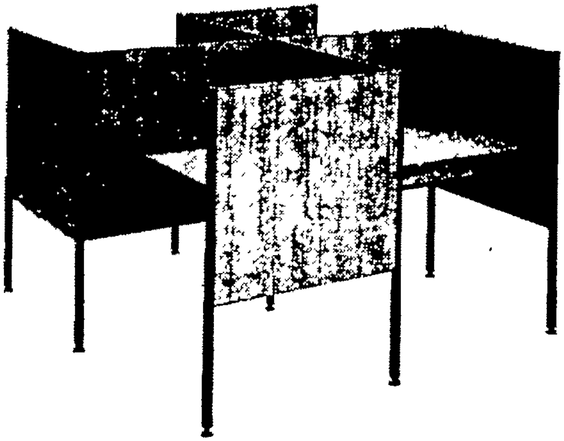

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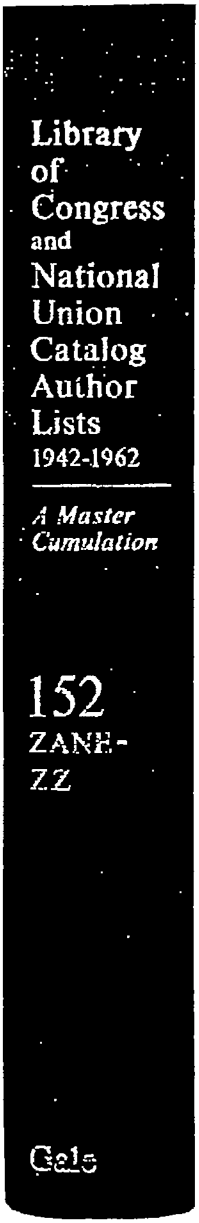
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ASLIB CALENDAR 1971

October

FRI.1.	Technical Translation Group meeting: 'Translation quality Workshop'. Aslib. 3 p.m.
TUE.5.	Audio Visual Group one-day Workshop: 'Slides'. Aslib.
SUN.10–THU.14.	Aslib 45th Annual Conference. Darmstadt, W. Germany.
MON.11.	Co-ordinate Indexing Group Meeting: 'The précis method', by D. Austin (BNB). Aslib. 3.45 p.m.
MON.18.	Social Sciences Group evening meeting: 'Foreign language and translation problems of the social sciences', by Professor W. L. Saunders (Sheffield University). Imperial College, SW7. 5 for 5.30 p.m.
WED.20.	Aslib evening meeting: 'Ergonomics and information systems', by J. G. Fox (Birmingham University). Royal Institution of Naval Architects, 10 Upper Belgrave Street, SW1. 5 for 5.30 p.m.
	Scottish Branch Workshop: 'Standards'. Strathclyde University. 6 p.m.
TUE.26.	Economic and Business Information Group evening meeting: 'UK statistical sources'. Aslib. 5 for 5.30 p.m.
WED.27.	Transport and Planning Group/LA Reference, Special and Information Section one-day conference: 'Pollution—sources of information'. Library Association.
FRI.29.	Technical Translation Group meeting: Seminar. Aslib. 3 p.m.

November

TUE.16.	Chemical Group evening meeting: 'Why toxicity testing?', by B. J. Simpson (Shell Research Ltd). Aslib. 5 for 5.30 p.m.
	Economic and Business Information Group visit to British Institute of Management, Parker St, WC2. 2.30 p.m.
THU.18.	One-day seminar: 'Analysis and design of systems with a consideration of the computer's role'. Connaught Rooms, Great Queen Street, WC2.
FRI.19.	Technical Translation Group meeting: 'Quality in the numerate society' by J. T. Craddock. Annual sherry party. Aslib. 4 p.m.
WED.24.	Aslib evening meeting. 'Administering diffuse collections', by W. Ashworth (Polytechnic of Central London). Royal Institution of Naval Architects, SW1. 5 for 5.30 p.m.

December

MON.13.	Social Sciences Group evening meeting: 'The SSRC project,' by J. E. Pemberton (Warwick University). Aslib. 5 p.m.
WED.15.	Aslib Christmas Party. Aslib. 5.30 p.m.

Forthcoming International Scientific and Technical Conferences

As readers may have seen from separate leaflets distributed with recent issues of *Proceedings*, Aslib has taken over from the Department of Education and Science the publication of *Forthcoming International Scientific and Technical Conferences*, the last issue having been published by the DES in January 1971.

Aslib will in future be producing four issues of this publication each year: the first issue will appear in January, followed by a supplement in April and cumulative supplements in July and October. Only one supplement will be produced this year and this will be issued free of charge to all those who take out a subscription to the four issues to be published in 1972. The subscription is £8.00 and orders (with remittance enclosed) should be sent to: Aslib Publications Sales, 3 Belgrave Square, London SW1X 8PL. The free supplement for 1971 will be sent to subscribers as soon as it becomes available.

Aslib has the co-operation of the Department of Education and Science in resuming publication of this list, and the DES has assisted in maintaining continuity by making available to Aslib material received since January and other relevant information concerning forthcoming international conferences.

Analysis and design of information systems with a consideration of the computer's role

An Aslib one-day seminar designed for people who are actively concerned with the design and improvement of information systems, at head of department and managerial level, will be held on Thursday, 18th November 1971, in the Connaught Rooms, Great Queen Street, London WC2. This is a follow-up to the teach-in for computer 'software' specialists and documentalists entitled 'Computers and the librarian', held in collaboration with the British Computer Society's Information Retrieval Group in 1967.

Like its predecessor, the seminar aims to be a serious learning occasion, an opportunity for participants to bring themselves up to date in this rapidly changing and developing field. The speakers, who include Aimée Chilton, Senior Lecturer in Computer Studies, Commerce Centre, City of Birmingham Polytechnic, David Martin of the INSPEC Project, F. Robinson from ICI's Central Technical Information Unit and B. C. Vickery and Harry East from Aslib's Research and Development Department, have been chosen for their intimate knowledge of their subjects and their ability to convey this in practical and relevant terms. Participants will be advised to undertake some recommended reading beforehand and it is expected that informed discussion and questions and answers will be an important element in the proceedings.

A programme and application form for this seminar were distributed with the August *Aslib Proceedings*, and further copies and information can be obtained from the Conference Organizer, Aslib, 3 Belgrave Square, London SW1X 8PL.

Ergonomics and information systems

At the Aslib evening meeting to be held on Wednesday, 20th October 1971, Mr J. G. Fox, Director of the Ergonomics Information Analysis Centre at the University of Birmingham, will speak on 'Ergonomics and information systems'.

The problem of efficiently structuring man-machine systems is the subject matter of ergonomics. In an attempt to handle problems in this context, ergonomics has developed a philosophical framework for the analysis, design and development of systems. It unashamedly over-emphasizes the human factor aspects and thus clearly only facilitates the use of human factors' data: leading to systems' models which account for efficiency in human factors' terms.

This is perhaps an extreme viewpoint but justified to a large extent when we consider that all systems are essentially extensions of human functions, exist to serve human needs and are directed ultimately by human beings.

In information storage, retrieval and dissemination systems which appear still to be searching for an analytical framework to allow a more systematic approach to their design, such a philosophy seems to be highly relevant. This paper explores the possible relevance, with particular reference to the real advantages which modern technology brings to the use of information systems.

The meeting will be held in the Weir Lecture Hall at the Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1, beginning at 5.30 p.m. (tea 5 p.m.). Chairman of the meeting will be Mr R. G. Griffin, Librarian of the Chemical Society.

Readers should note that all Aslib evening meetings during the 1971/72 season will be held at the Royal Institution of Naval Architects in Upper Belgrave Street (this runs southward out of Belgrave Square, parallel to Grosvenor Place).

Audio Visual Group: Slide Workshop

Slide collections, which are rapidly developing in libraries of all types, present particular problems of organization and exploitation. At a 'Slide Workshop', organized by the Audio Visual Group, to be held at Aslib on Tuesday, 5th October, speakers will discuss the administration of slide collections, including practical aspects such as acquisition, storage, cataloguing, classification, retreival, etc. Speakers will be: Richard Bird (Librarian, Ravensbourne College of Art and Design); Michael Roberts (Librarian, Faculty of Construction Technology and Design, Polytechnic of the South Bank); Roy Tabor (Regional Librarian, Wessex Regional Hospital Board); and Lorraine Williams (Fine Arts Librarian, Westminster City Libraries).

The fee will be £2.00 to members and £3.50 to non-members. A wine party will be held at the Library Association after the Workshop, beginning at 7.30 p.m. (cost 50p).

Social Sciences Group meeting

At a meeting of the Social Sciences Group, to be held on Monday, 18th October, at the Imperial College of Science and Technology, Professor W. L. Saunders, Director of the Postgraduate School of Librarianship and Information Science at the University of Sheffield, will speak on 'The foreign language and translation problems of the social sciences'. The paper will review the findings of the Sheffield Language Barrier Report and the Bath University INFROSS investigations from the point of view of the implications for social scientists. The paper will comprise a review of the problem and will indicate some possible solutions.

Chairman of the meeting will be Mr L. J. Lawrence, Chairman of the Aslib Technical Translations Group. The meeting will begin at 5.30 p.m. (tea 5 p.m.).

Technical Translation Group Meetings

Friday, 1st October 1971: 'Translation quality workshop' is the title of the Group's meeting to be held on this date. This will be a discussion, introduced by Mr J. T. Craddock, of the project on quality in translation which is being undertaken by a sub-committee of the Group.

Friday, 29th October: This meeting will be a shortened form of the seminar which was to have been held at the UKAEA Laboratories, Culham, on 30th September. Passages for translation which would have been done at the seminar will now be completed by members and submitted before the meeting, where the results will then be discussed.

Friday, 19th November: 'Quality in the numerate society' will be the subject of a talk by Mr J. T. Craddock, which will be followed by the Group's annual sherry party.

All these meetings of the Technical Translation Group will be held at Aslib Headquarters.

'Pollution: sources of information': a one-day conference

The Aslib Transport and Planning Group and the Reference, Special and Information Section of the Library Association are holding a one-day conference on 'Pollution: sources of information', to be held at the Library Association, 7 Ridgmount Street, London WC1, on Wednesday, 27th October 1971.

The Royal Commission on Environmental Pollution in its first report (Cmnd 4585, HMSO) in February 1971, stated that: 'The problem we face is how to strike a balance between the benefits of a rising standard of living, and its costs in terms of deterioration of the physical environment and the quality of life'. The increased awareness of the pollution problem has resulted in recent years in the growth of information on pollution and its control. As with all growth subjects there are difficulties in controlling the literature and finding out what research is being done.

The morning papers at the conference will be given by two research workers and will be entitled 'What is pollution?' and 'Information needs of the research worker'.

The need, and the problems faced by the researcher, having been established, the afternoon session will be devoted to a series of short papers on the sources of information available. Speakers will cover the sources of information on the following subjects: air pollution, noise, marine pollution, and the general documentation of pollution. It is planned to provide time for discussion and for contributions from the floor.

An exhibition of relevant material will be arranged and it is hoped that a catalogue of the exhibition will be available.

The conference fee will be £5 inclusive of morning coffee, lunch and afternoon tea. Further particulars and application forms are available from: Mr. G. Mort, Somerset County Library, Mount Street, Bridgwater, Somerset (Tel. Bridgwater (0278) 51201 Ext. 10).

Junior Workshop

The East Midlands Section of the Midlands Branch, in conjunction with the Industrial Group of the Library Association, plans to hold a Workshop for junior library staff. The Workshop will be held at Loughborough Library School on a Wednesday in November (date to be fixed). Participants will be split into discussion groups on such topics as circulation of periodicals, inter-library loans, handling of translations, etc. Full details may be obtained from D. P. Woodworth, School of Librarianship, Loughborough Technical College, Loughborough.

Industrial Data for Engineering Application

The Director of Aslib was among a large number of distinguished guests at the launch recently of Engineering Sciences Data Unit's new series of evaluated data: 'Industrial Data for Engineering Application'. This series is a further addition to ESDU's long established series of Data Sheets and Memoranda covering the fields of Aeronautics, Chemical Engineering and Mechanical Engineering.

The Industrial Data for Engineering Application consists of three sub-series: Fluid Mechanics (Internal Flow); Fluid Mechanics (External Flow); and Stress and Strength. The basic data on these subjects is collected and evaluated by the staff of ESDU, with the assistance of many individuals and organizations throughout the world. The work of the ESDU staff on this series, as with the already established series, is monitored and guided by Technical Committees whose members represent industrial companies, government research laboratories, universities and others.

Guest of honour at the reception was Lord Kings Norton, one of the founders of the evaluated engineering data concept during the last war. Introducing the new service, he said that he was delighted to find that the work started over thirty years ago had blossomed into a world-wide service to science and engineering.

Further information about ESDU's services is available from: Engineering Sciences Data Unit Ltd, 251–259 Regent Street, London W1R 7AD.

Institute of Information Scientists: Scottish Branch

A one-day conference of the Scottish Branch of the Institute of Information Scientists will be held in Edinburgh on Friday, 12th November 1971, on 'Getting and giving information'. The speakers will be: M. W. Hill (Keeper, NRLSI) on 'The development of the NRLSI: remote access to Reference Library facilities'; K. Bramwell (ICI Agricultural Division) on 'ASSASSIN: operating a versatile computer-based information storage and retrieval system'; and Magnus Pyke (Distillers Co. Ltd) on 'The scientific scholar'.

The conference fee (including coffee, lunch and tea) is £3.00. Application forms can be obtained from the Honorary Branch Secretary (Mrs A. B. Berrill, 31 Braid Avenue, Edinburgh EH10 4SR). Closing date for applications is 16th October 1971. Aslib members will be very welcome.

City and Guilds Library Assistants Certificate

Since 1967 the City and Guilds of London Institute has offered the Library Assistants Certificate (LAC), intended to provide a basic qualification for people employed by libraries and information bureaux in a non-professional capacity who do not aim at professional status. Although the number of candidates for the examination has risen rapidly (in 1970 nearly 500 came forward, of whom 94.4 per cent passed), the LAC Advisory Committee are, however, disappointed to find a rather small proportion of candidates coming from special libraries, since the scheme was designed with their needs in mind.

The emphasis of the scheme is on practical skills, and the theoretical content of librarianship is taught only to the level necessary for a sound understanding of library practice. A number of colleges now run part-time courses for the Certificate and enquiries about forthcoming courses should be addressed to: Mrs B. Green, The Secretary to the LAC Tutors Discussion Group, St Albans College of Further Education, 29 Hatfield Road, St Albans, Herts.

Annual Statement of Trade

The Statistical Office of H.M. Customs and Excise have announced that, in the light of the improvements to the monthly *Overseas Trade Statistics* introduced last year, and of the increasing use being made of the facilities offered by the Customs Bill of Entry service, it has been decided to review the future of the *Annual Statement of Trade* (including the favourable basis on which its price is at present calculated). *The Annual Statement of Trade* provides, in five volumes, a comprehensive picture of imports and exports which, though more detailed than the *Overseas Trade Statistics*, is nevertheless appreciably condensed compared with the detailed tabulations from the Customs Bill of Entry service.

No radical changes, however, will be made to the *Annual Statement* until the views from users of the publication have been obtained. The Customs and Excise Statistical Office would be grateful therefore for comments from users on the value of the *Annual Statement* in its present form; and for information on any serious inconvenience which would arise if overseas trade statistics were to be available only in the format of the *Overseas Trade Statistics* (including Volume I of the *Annual Statement* which is to appear in future, irrespective of decisions about the rest of the *Statement*) and in the detailed tabulations from the Bill of Entry service.

Users' views should be submitted, by 31st October 1971, to: The Controller, H.M. Customs and Excise, Statistical Office, Portcullis House, 27 Victoria Avenue, Southend-on-Sea, Essex, SS2 6AL.

Dewey Decimal Classification

The Forest Press, publishers of the Dewey Decimal Classification, announce the completion of Volume 2 of *Dewey Decimal Classification Additions, Notes and Decisions*. The volume consists of number 1, Spring 1967 and number 2, Spring 1971. Subscribers to the 17th Edition of DC may obtain copies of the 1971 issue from the publisher's Albany Office: Forest Press Inc., 85 Watervliet Avenue, Albany, New York 12206, USA.

BRIEF REVIEWS

ACRONYMS AND INITIALISMS DICTIONARY. 3rd edition. Edited by Ellen T. Crowley and Robert C. Thomas. Detroit: Gale Research Co., 1970. 484 pp. $22.50.

There has been an exceptional increase in the number of items contained in this publication: there are 90 per cent more terms in this edition than in the last edition published in 1965. This is due, to a great extent, to the many new terms introduced into the aerospace field and also to the proliferation of 'prefabricated' acronyms occurring when an acronym is coined first and the abbreviation then filled out with appropriate words.

The format of the volume has been completely altered. A considerably larger page size has been used with two columns of terms on each page. The arrangement is alphabetical by acronym or initials and the country of origin of the term is often shown. Supplements entitled *New Acronyms and Initialisms* are scheduled for publication in 1971 and 1972.

AFRICA: SOUTH OF THE SAHARA, 1971. London: Europa Publications Ltd, 1971. 1024 pp. £9.00. (ISBN 900362 24 3)

This entirely new Europa publication is likely to be of greater interest than its title implies. Although Algeria, Libya, Morocco, Tunisia and the United Arab Republic are excluded, being covered previously in the sister publication *The Middle East and North Africa*, the general sections provide information on the continent of Africa as a whole. The layout follows that of existing Europa publications. Part 1 consists of a number of articles, by experts in the field, on subjects of background interest, for example, agriculture, history, industrialization and finance. Part 2 lists regional organizations. Details of the basis of union, members and functions, etc. are provided for the more important organizations, while the remainder are arranged alphabetically under broad subject headings. Part 3, the bulk of the publication, lists the specific information, statistics and associations for each country. A who's who of the area and a list of institutes outside Africa, which are concerned with Africa, are two main constituents of part 4.

There can be no doubt that this publication will prove most useful to those concerned with tracing information on this previously poorly documented continent, though it is to be hoped that should later editions be contemplated the publishers will seriously consider the possibility of providing indexes.

INSTITUTION OF CIVIL ENGINEERS. Index to publications, January 1965 to December 1969. London: ICE, 1971. 114 pp. £1.00.

This is a cumulative index covering all the contents of the *Proceedings, Institution of Civil Engineers* and *Géotechnique* (excluding News items), as well as the separate publications such as conferences, symposia and committee reports of the Institution published during the five years 1965–69.

The index is divided into four sections: an author catalogue of titles, a subject index, a locality and project name index, and a personal name index to biographies, obituaries, etc.

NATIONAL REPROGRAPHIC CENTRE FOR DOCUMENTATION. Directory of electrophotographic copiers in the United Kingdom. Hatfield (Herts.): the Centre, 1971. 86pp. £1.50 (£1 to NRCd subscribers). (SBN 85267 029 X)

This is the first edition of a directory of electrophotographic copiers (popularly called electrostatic copiers) available in the United Kingdom. Seventeen firms, supplying between them forty-three machines, are represented, and the directory is claimed, in the accompanying press release, to be comprehensive.

Machines are described for use in a wide range of situations, from simple desk copiers to complex models with hopper feeds and on-line collators. Together with technical specifications concerning, for example, sizes of originals, images and copy paper, time taken to deliver copies, controls and power supply, data is given on costs (price, rental terms—though these are not always stated in full—and cost per A4 copy) and on servicing facilities. All but one of the machines are illustrated.

Entries are arranged alphabetically by manufacturers and supported by an index in the same order.

COST-EFFECTIVENESS

ALAN GILCHRIST

Aslib Research and Development Department

Paper presented at the Aslib Midlands/Northern Branch Joint Conference, Cambridge, 29th April–1st May 1971

An analogy

THIS CONFERENCE is an information system—you are the users and I am one of the documents that has been retrieved by the system operators. Each of you will 'read' up to six documents and will, I hope, discuss them with each other. The cost to each one of you is the £14 conference fee plus incidentals. Few of you will have met this cost yourselves, having persuaded your employers to foot the bill as well as giving you a day off to attend the conference, making a total cost of the order of £25 per organization. The conference organizers have controlled the finances and, like you, have chosen to expend energy on this exercise rather than some other activity. Three groups of people, the conference organizers, your organizations and yourselves, all have individual expectations and when the conference is over will assess to what extent these expectations have been met. The conference organizers will heave a sigh of relief before becoming involved in planning next year's conference, when they will take into account those of your views of this year's conference that they come to hear about. Your views, I suggest, will depend to a considerable extent on chance: the conversation you happened to have with the person sitting next to you at dinner; a train of thought stimulated by a discussion of one of the papers and, in the even longer term, the unforeseen connection between something a speaker said and a problem encountered a month later. As for the people who actually paid the money—some organizations require delegates to present formal reports when they return to work, and must rely on this method of assessing whether their money was well spent. As conferences continue to be organized for the exchange of information we must assume that they are worthwhile. I personally think they are, and though I hate to say so at this particular moment, there is clearly a lot of truth in the often heard general assessment: 'It's not the papers you listen to, it's the people you meet.' Incidentally, if this assessment is accurate, it is worth considering to what extent conferences are organized to meet this primary objective.

This analogy underlines I think some of the problems of cost-effectiveness:

(a) The different standpoints from which we may judge success.
(b) The different ways in which success can be judged from these standpoints.
(c) The existence of long term effects.
(d) The difficulty of relating a cost to a complex purchase.

Cost-benefit analysis

The idea of relating resources expended in producing an output to the effects of that output are, of course, not new. I was, though, surprised to read in a survey of cost-benefit analysis (CBA)[1] that a classic paper on the utility of public works appeared in the economics literature as long ago as 1844. CBA is defined by the Treasury[2] as being 'a systematic comparison between the cost of carrying out a service or activity and the value of that service or activity, quantified as far as possible; all costs and benefits (direct and indirect, financial and social) being taken into account'. This definition is accompanied by the explanation that 'CBA involves the listing and consideration of as many effects as can be identified—beneficial and adverse, short-term and long-term, tangible and intangible—on all persons and groups likely to be affected (however remotely) by a proposed project or service. The value of this appraisal depends on how completely all effects can be traced and the extent to which they can be evaluated in comparable (normally monetary) terms.'

CBA has been used extensively in many areas such as health, education and transport. You will all have heard mention of its application, for example, when the M1 motorway and the Victoria Line were being planned. The M1 analysis was a complex exercise which classified net annual savings under four heads:

1. those relating to diverted traffic;
2. those relating to generated traffic;
3. savings in non-business time;
4. the effects on the growth of the GNP;

but still it was criticized for omitting:

1. allowances for police and administrative costs;
2. benefits accruing to pedestrians and cyclists;
3. advantages of more reliable goods deliveries.

It was also criticized for introducing inconsistencies between long-term and short-term views and for an inadequate appraisal of the savings due to accident reduction. Since the M1 study we have seen the Buchanan Report—a study of no less a topic than the long-term problems of traffic in urban areas. This report included the notion of 'environment' in calculations for urban road improvements which makes the estimation process extremely complex, if it is feasible at all. More recently still, there has been a small furore over the application of CBA to the siting of London's third airport. An article written by Peter Self, Professor of Public Administration at the University of London, engagingly titled 'Nonsense on stilts: the futility of Roskill',[3] attacks the basic methodology adopted by the Commission. He says, for example: 'CBA gets its plausibility from the use of a common monetary standard, but the common value of the £ derives from exchange situations. Outside such situations common values cannot be presumed, and symbol and reality become easily confused. . .' Later on he says: 'It is just possible that cost-benefit exercises have some utility as supporting evidence for certain kinds of decision. But when this art is elevated to the level of a comprehensive framework for decision-making, the costs of cost-benefit become severe indeed, amounting almost to actual vitiation of proper professional and political procedures.' More recently, Buchanan, who was a member of the Roskill Commission, was reported as saying that 'he "quite literally" failed to understand the details of the massive cost-benefit analysis—the biggest of its kind ever undertaken in this country—which had dominated his colleagues' decision to go for Cublington rather than Foulness'. The report went on to say that 'as the mathematics involved were extremely complex it would have been surprising if any non-specialist had followed the analysis, but more important—he doubted the relevance of economics to the issue. His decision was made finally "on a hunch"—a deep down feeling telling him where to go!'[4] It can be seen how difficult it is to identify all effects, beneficial and adverse, long-term and short-term, tangible and intangible. Furthermore, the effects of a system may be far reaching, as the wake of a river boat is far more pronounced than the ripples which erode the banks. The system is part of a larger system and is related to many others but where does one draw the line? Finally, CBA requires very careful interpretation but still the hunch may be more important.

Cost-effectiveness analysis

Cost-effectiveness analysis (CEA) is a less romantic and more down-to-earth variant of CBA, and again I turn to the Treasury glossary[2] which gives definitions of two aspects:

'a method of finding either
(a) the cheapest means of accomplishing a defined objective or
(b) the maximum value from a given expenditure.'

and as examples of these

(a) 'would be the analysis of the cost of cleaning office buildings to see whether contract or directly employed labour provides the cheaper method of cleaning to a reasonable standard;

(b) 'may often be the more difficult exercise to carry out: it may be necessary for example to try to measure the combined effectiveness of a mixed military force. This form of analysis has been used particularly in the defence sector where the benefit in terms of military capability or military effectiveness cannot necessarily be expressed in financial terms.'

Evaluation of information systems

I shall now discuss briefly three recent research projects which have been based on cost-benefit and cost-effectiveness analysis.

I hope you will forgive me for taking you yet again into the well-charted Wessel territory,[5, 6] but his project was so thorough and well-informed that it would be less sensible to avoid mentioning it. Wessel started with a survey of the literature and state-of-the-art from which he concluded that, for his needs, CEA was one of only three techniques of central importance. He also recognized four general aspects of library performance:

1. Philosophical—relating to the statement of the reasons for the library's existence.
2. Management—relating to the influence on the efficiency and effectiveness of the library of management practices.

3. Services and products—relating to the library outputs and measures of service or product effectiveness.
4. Operations—potentially useful as a basis for performance evaluation of the staff's professional actions.

In one use of CEA, Wessel identified each significant service, activity and operation and constructed a procedural model based on these components. The model included alternative routes because, of course, each chain has one or more entry points. Each event block in the flow chart, e.g. 'User contacts library or librarian to satisfy informational need', was then assigned a figure representing the probability that that event would occur. This figure was based upon past experience, subjective analysis or statistical sampling. Now, each activity is represented by the connecting line between events, and those activities which accrued significant costs were assigned standard cost data, these data also being derived from past experience, or generated by techniques such as work measurement. It was then possible to derive measures of effectiveness from the probabilities that events would occur when a number of needs were processed. The first use of this analysis was to identify and investigate 'effectiveness causal factors'. For example, events with low probabilities of occurring were investigated, as were the effects of activities on the probability of occurrence of a subsequent event. The second use of this analysis was to arrive at a figure of effectiveness for any chain of events and activities expressed as the product of effectiveness probabilities. For example, one objective of reference service or search service may be simply to identify some candidate documents for an informational need. The effectiveness of this service in meeting this objective can be measured by the probabilities of communication of needs, of the librarian beginning a search and of the librarian identifying some candidate documents. This technique is based on the correct formulation of goals and objectives, a point which Wessel emphasizes particularly strongly, and this in turn is based on the proper determination of the services needed by the user.

A project undertaken at Durham University[7] started with the intention of assessing the benefits accruing from a university library by gathering subjective evaluation from the academic staff. This approach was later changed to a methodology which assumed that the library manager, by intelligent and constant interaction with the users, was highly likely to optimize his system. The Durham team constructed a model into which they fed:

(a) the total resources—in terms of labour time, money, seats, and shelf space available during, say, the coming year;
(b) the unit cost of each activity in these terms;
(c) the present volume of each activity—items acquired, loans per year etc.

A computer was then used to manipulate these figures and to show that, for the library being examined, adding one item to stock appeared to be rated as equal in user benefit to:

–providing 4.5 inter-library loans;
–catering for 1,270 user-hours of reading on premises;

–providing 90 items on long loan;
–or 203 items on short loan;
–using 3.4 hours of senior librarian's time on advisory work;
–or 9 hours of junior librarian's time.

By manipulating the model in the opposite direction (a technique known as inverse linear programming) the librarian may determine the best way of allocating resources in the changed circumstances. In addition, the model allows the librarian to make subjective alterations to ratings and for certain constraints to be built in.

The third study I want to refer to was undertaken by consultants[8] on behalf of the Department of the Environment as part of the latter's programme of investigation into the problem of data co-ordination in the Construction Industry. The consultants were asked to investigate the feasibility of setting up a central file containing information about commodities used by the construction industry. During the second phase an attempt was made to estimate the cost benefit of about fourteen alternative systems. The study which will be published later this year identified twelve characteristics which could provide potential benefits:

Response time—savings in time to answer enquiries.
Increase in complexity of enquiries leading to further time savings.
Reliability or system.
Reliability or accuracy of data.
Up-to-dateness.
Comprehensiveness of coverage—increased choice.
Depth of data for products—including ease of comparison.
Presentation—including ability to provide hard copy.
Browsability.
User convenience.
Feedback to users.
Feedback to manufacturers.

Of these they concluded that 'Response time' was the one item that related directly to the number of enquiries put to the file. The value of the 'annual user time saved' by a particular alternative was compared with the cost of that system and the result expressed as a net benefit if positive or a net cost if negative. The 'annual user time saved' was based on survey, past experience and estimation. The report concluded that the evidence from the various approaches suggested that a computer system would show a total benefit of the order of £10 million per annum as against £5 million per annum for a microform system, the others being non-starters.

At this stage, like Buchanan, you might feel inclined to give up the detailed argument and rely on your hunches. You might also, with some justification, question the validity of such analyses, and certainly they should be approached with a healthy degree of watchful scepticism. At least five points emerge from these projects:

1. Such studies are detailed and complex. Think particularly of Wessel's

procedural analysis. At broader levels the figures become very large and difficult to assess. The commodity file study was based on estimates of 18,500 organizations, posing 125,000 enquiries per day, concerning some 360,000 products and marketed by some 12,000 manufacturers.

2. They rely on detailed and reasonably accurate costing.
3. They rely very often on some pretty broad assumptions. For example, Durham based their whole methodology on the assumption that a librarian was likely to optimize his system, but one may question whether the benefits as assessed by the librarian are adequately related to the needs of the community served by the library. The availability of services, and the user's expectation of success will have marked effects on demand.
4. They are based on evaluation of criteria which are difficult to assess objectively. It is significant that the Department of the Environment's study used the single criterion of saving the time of the user.
5. Though the methodology may be widely applicable, the collected data is not, in general, universally true. For example, the figures of equivalent benefits obtained in the Durham project related only to a particular library at a particular time.

I should like now to restate the problems, how I think they should be viewed and what we can all do about it.

Aiding decisions

One of the clearest writers on this subject (in the information science literature) is Lancaster and I can strongly recommend a recent article of his in the *Journal of the American Society for Information Science* with the title 'The cost-effectiveness analysis of information retrieval and dissemination systems'.[9] Lancaster says that an information system can be evaluated from any one of the following viewpoints:

1. How well the system is satisfying its objectives, which will usually mean how well it is satisfying the demands placed upon it. Here we are evaluating the effectiveness of the system.
2. How efficiently (in terms of costs) it is satisfying its objectives. This is cost-effectiveness evaluation.
3. Whether the system justifies its existence (i.e. the system worth). In evaluating system worth, we are concerned with cost-benefit relationships.

These three viewpoints incorporate three vital measures. Costs can be classified as the prime expenses of documents and direct material, labour and expenses, and as the production overheads attributed to indirect material, labour and expenses. But in cost-effectiveness analysis we must also be aware of variable costs. For example, if we increase the number of retrospective searches conducted from 1,000 per year to 1,500 per year, the cost per search may be reduced by £x. We are still very short of comparative cost figures which we can use with any degree of confidence. The second measure is effectiveness and this is a measure which can be calculated only if we have defined our objectives and the criteria by which we can assess to what extent those objectives have been met. The feasibility study of a central commodity file listed some user criteria. These are possibly based on the user criteria for a document retrieval system listed in an earlier article by Lancaster[10] as Coverage, Usability, Recall, Precision, Response time, Presentation and User effort, of which the most important appear to be Coverage, Response time, User effort and our old friends Recall and Precision. Lancaster also pointed out that these user criteria were not the only ones and that it was necessary to consider two groups of management criteria:

(a) the criteria of system operators and of the immediate administrators of the system;
(b) the criteria of 'top management'.

The third measure is benefits and these are more difficult to quantify. Lancaster lists four broad benefits:

1. Cost savings in using the system as compared with the costs of finding needed information elsewhere.
2. Avoidance of loss of productivity.
3. Improved decision making or reduction in the level of personnel required to make decisions.
4. Stimulation of invention—a serendipity factor.

At lower levels the relationship between cost and effectiveness may be somewhat difficult to distinguish from the relationship between cost and benefits. An example is given by Lancaster:[9] 'Suppose we reduce the average number of terms assigned in indexing, and thereby reduce the average indexing time per item. We could say that an immediate benefit of this action is to reduce input costs. On the other hand, such an action is likely to have a very definite influence on the effectiveness of the system (the average precision of the system may increase—and this in itself may be regarded as a form of benefit—while the average recall will almost certainly decrease). In other words, this action has had immediate observable benefits (in terms of cost saving at input), it will have a long-range influence on the effectiveness of the system and it may have an even longer range influence on the benefits of the system's products to the end user.' This is not playing with words, but is a good illustration of the balancing of costs, performances and benefits in relation to time. And it is balance which one is seeking in system design and performance, which is why one should be conscious of such factors as 'trade-off'—the comparison of the benefits which would arise from alternative uses of given limited resources (for example, almost invariably economies in input procedures will result in an increased burden on output processes and thus output costs) and 'diminishing returns'—graphically summarized by Bourne[11] in the statement: 'We can design a system capable of satisfying, efficiently and economically, 90 per cent of the user requirements, but to satisfy the remaining 10 per cent would require a disproportionate increase in costs and in effort.'

So, the examination of costs, performance and benefits and their correlation using such concepts as trade-off and diminishing returns is an analytical aid to decision making and not a magical trick which is going to solve all our problems tomorrow. In a much quoted statement, Quade[12] has said: 'It is important to remember that all analysis of choice falls short of scientific research. No matter how we strive to maintain standards of scientific inquiry or how closely we attempt to follow scientific methods, we cannot turn cost-effectiveness analysis into science. Its objective, in contrast to that of science, is primarily to recommend—or at least to suggest—policy rather than merely to understand and predict.' Aiding decisions by the use of cost-benefit and cost-effective analysis is important to the librarian for two inter-related reasons—justification and resource allocation.

The problems of dwindling resources and the growth of knowledge are real and serious and libraries are in competition with other services for funds. Some convincing arguments must be produced. It will not be enough to rely on horror stories of wasted money and wasted endeavours caused by poor information systems: Carlson[13] has in any case shown that these are generally apocryphal—in particular the old chestnut that 'it is probably cheaper to do a research job under $100,000 than to search to see if the work has already been done'. Carlson found that what was actually said was: 'if it were not for the creation of such centralized documentation services as ASTIA it might be supposed that some day in the future a research manager could find it more economical to do the research than to search the literature—if the research cost less than some figure, such as $100,000'.

What librarians and information officers, particularly in industry, must do is to establish a stronger relationship with management. I know this has been said before, but I am not aware that very much has been achieved in this direction. Firstly, what we need collectively is an objective argument based on the economics of information, its handling and its value. A classic paper by Carter and Williams[14] appeared twelve years ago. The authors observed a direct relationship between technical progressiveness and financial success, which was demonstrated by such characteristics as:

Good information sources.
Readiness to seek information and knowledge of practice from external sources.
Willingness to share knowledge—technical, managerial and commercial.

I wonder whether it has affected management thinking or whether its findings have been used or extended by information scientists?

Secondly, I think that information scientists must be prepared to extend their horizons, so that instead of being content to provide a service, they are in a position to work out with management what objectives they should pursue in order to be more closely integrated with the information needs of decision makers. I know that information officers are a community particularly hard worked in maintaining their services, so I hope you will not think it impertinent of me to suggest that it is possible we are not making the best use of our intellectual resources in a rapidly changing environment. Shoffner[15], writing in the US, reports that there has been virtually no increase in productivity in library operations over the past twenty years, and Schon[16] in last year's Reith lectures gave a fascinating account of radical changes in organization and objective-setting in systems as disparate as NASA, the 3M Company and the underground student movement. We too may have to make some radical changes in the design and organization of our information systems.

Having justified our existence we must allocate our resources in the best possible way and it is guides to resource allocation that come out of the work of Wessel, the Universities of Durham and Lancaster and others working in the general area of management science. These are complex and time-consuming exercises probably beyond the resources of most information officers to set up for themselves. Some of these projects will undoubtedly produce usable data or mathematical models from which data may be derived, but what can the average information officer do for himself? I think he can do two things:

(a) learn something about management techniques so that he can use what he finds useful, particularly for control; and talk to his managers in their own language;
(b) collaborate in schemes for the pooling of basic data.

I should like to end by outlining two research projects which should help in both these approaches.

The Library Management Research Unit of the University of Cambridge is designing a Management Information System for library administration, the methodology involving techniques of data collection, analysis and presentation. It is the Unit's intention to design a simple-to-use system, which initially will be applicable to university libraries. The collection of data on times is based on a simple diary technique and we at Aslib are investigating with the Unit the possibility of devising a standard form of cost analysis based on diaries which could be extended for use in other types of library. Activity times can be arrived at analytically by diary techniques, activity sampling and direct observation. One can either break off at a procedural level, or one can go further to the task level to produce synthetics which can be reconstructed. Aslib is also investigating this approach and eventually will attempt to relate the two approaches. In the current part of our project, data of the following form has been collected: time taken to perform an operation on a particular item (e.g. abstracting, cataloguing, classifying), together with some information about the item or the process (e.g. language, how many cross-references or analytical entries were required—these being the variables we think will have a major effect on the time). The problem has been to analyse the quantitative effect of each variable. It proved useless to examine each variable separately, ignoring all the others, as each effect was distorted or swamped by all the others. It has therefore been necessary to develop a method (a form of multiple regression) which will take account of all variables simultaneously. We are now getting results which make reasonable sense (e.g. in the system studied the major effect on the cataloguing time was whether and how many analytical entries were required). One very encouraging result is that in the one case where we had two people doing the same job, we analysed the results, considering the person doing the job as a further variable, and found this to be the least significant of all the variables. At the most superficial level, we intend to identify just which variables affect processing time and rank these. This will be of some value in itself to designers. More importantly, we hope to produce standard costs which will be defined in terms of variables and context and so may be used with greater confidence. This is a huge undertaking which we do not ourselves have the resources to complete, so we shall be inviting the Aslib membership to take part. As soon as we have established the methodology (which we want to keep as simple as possible) we shall conduct a pilot run in which information officers will collect data in their own libraries, reporting to us in a standard format. If this is successful we shall extend the project to include anybody who would like to use the technique. The more that take part, the wider will be the range of information available and the more accurate the data.

This talk was entitled simply 'cost-effectiveness', a term which the Treasury glossary includes as being synonymous with 'cost-consciousness'. This is a condition we can hardly avoid in the present economic climate.

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LIBRARY SCIENCE LITERATURE: SOME PROBLEMS OF INFORMATION ABOUT INFORMATION

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Paper presented at the Aslib Midlands/Northern Branch Joint Conference, Cambridge, 29th April–1st May, 1971

WHEN I RECEIVED your Honorary Secretary's invitation to speak at this conference I was naturally very flattered—because nobody had ever asked me to speak at a library conference before—and the choice of subject suited me, since it has been my concern over the last seven years of my professional career and since I was already about to prepare a contribution to another work on much the same topic. So I accepted the invitation with eagerness. But that was several months ago, and in the interim I have been getting progressively more uneasy. The other assignment I mentioned—a survey of the last five years' production in library science literature for our new reference work *BLIS*—had been completed, not without a struggle, and far from thinking afterwards that I could incorporate the same material into this talk, I was led further into doubt about what I should say, doubt about why I was being asked here at all, and what my qualifications were for saying anything at all to anyone. I thought back over the conferences I had attended as an all-too-silent observer these last seven years and asked myself what common characteristic the speakers had that I could now lay a claim to. They seemed, many of them, to be full-time research workers, or recipients of grants, people with a lot of ideas about the future of the profession, library school lecturers, educationists with a discerning or a patronizing interest in libraries, political figures dragooned into giving their set speeches to, for a change, library audiences, and quite simply, people talking about their day-to-day work. Only the last category was open to me, and you will be pleased to hear that I do not intend to talk about my work at the Library Association, except incidentally.

All I can therefore offer you are some random or half-baked reflections on the subject allotted to me. As far as that subject has any meaning at all I shall stick to it: 'library science literature: problems of information about information'. But it was rather catchpenny, and was chosen some time ago. What I now propose to give you are three fairly closely related aspects of the whole affair: library science—what is it? how is the writing about this subject managed internally? and how is it managed externally? I have no idea as I write this whether my use of the term 'management' is going to fit in with the rest of the conference, but I shall have to leave that to chance.

1. Library science—what is it?

We always have to start by defining terms, but in this case I intend to devote quite a bit of time to definition, since I feel that poverty of definition is one of the basic problems that librarianship or library science suffers from; and it will help, I hope, to consider some definitions that have been made in the recent past, and to ask not only what is inside the circle, but what is just outside, whether it is asking to come in, and whether our circle of definition should be hospitable in this way.

My own conception of the subject—which because of my work has to be strictly utilitarian, and basically very simple, so that I can always recognize exceptions to it—is that librarianship or library science (and these terms are interchangeable for me, as far as their content goes) is concerned with the organization and exploitation of collections of documents. Any other related subject, I maintain, is either an extension of this or more or less on the fringes of library science. Each word in that definition itself requires definition, but we shall leave that for now, and see if others agree with the basic idea.

Philip Corrigan in 1968 had something to say about defining library science, and since his paper[1] is still unpublished I will take the liberty of quoting from it:

> This writer has defined library science as information concerned with creation, recording, transmission, storage, retrieval and use of information.

I don't much care for this, except that it seems to embrace the second half of my title 'information about information'. But I regard information about the creation of information as rather vague, and possibly fringe, if not irrelevant. Corrigan is concerned to be all-embracing in defining the librarian's function, but he agrees that the subject can be represented by a 'hard core of information (about which there is a professional, educational or scientific consensus) and a series of fringe subjects arranged around this core'. I think that Corrigan has been misled by the desire to define librarianship as a single activity, instead of, as I see it, a double one. Not that there is any magic in being twofold either—it just happens to be the way the subject presents itself to me. Corrigan's 'core' is that of Lawrence Clark Powell: 'The nucleus of a library is anyone reading a book.' I think that tells us more about Powell, the book-loving humanist, than it does about libraries. Corrigan moves outwards from this individualist conception of the library as a personal act of contact between reader and document to include the libraries within which the act takes place, and all the paraphernalia of organization and classification, cataloguing, getting and spending, which seem to be necessary to allow this act to go on in the best conditions.

I do not have this philosophic approach. I see library science as the study of what librarians need to know and do. This is dodging the question, but then libraries are as you find them; their purposes will change over the years, and from country to country. We have libraries and librarians: it is better to see what makes them tick now, and deduce what is common, than to erect a symbolic act as a totem, and draw concentric rings of decreasing relevance around it. I would rather see our chosen definition as a cluster of no fixed shape: there will always be occasions when we cannot be sure whether what we see is library science or something else; and we should expect that: library science is as arbitrary a concept as anything must be that has grown up as the conglomeration of innumerable acts of individual people in the past and the present. And the rings around what core we decide upon will not be concentric either. We shall have to adopt other shifts as convenience dictates. I, again, see librarianship as rather like the common sections of two overlapping circles, with other circles of varying size coming in from time to time: rather like a Venn diagram gone crazy.

The two circles are the traditional disciplines of the librarian in history; and the new world of what we must temporarily call information science. The traditional idea of a librarian included many things that most would now reject: that he should know about libraries in general is quite a novel idea for the librarian; he was more expected to be a scholar; to know about bibliography, enumerative and critical, to be a palaeographer, to know about the history of printing and publishing; his languages would be Latin, Greek, French, German, Spanish and Italian, probably in that order; his later successors would know about museum curatorship, and would not be at sea in running an art gallery. He would be a committed humanist, and in recent years his interests would run to local history, to the study of educational theory, the prevalence of reading and its encouragement, and the significance of cultural movements. His technical needs would be strongest in administration and management, and his hobbies might include subject bibliography. As he gained seniority his general sense of administration would enable him to pick up a necessary amount of know-how in planning buildings, in deciding on classification policies, in catering for the needs of his readers, and in knowing roughly when to bring in the computer men. You could say his success in the modern world will be measured by his ability to know which experts to listen to.

The information scientist, on the other hand, is someone we know much less about, because his pedigree is shorter, and because people with very different definitions are now calling themselves by this name. In terms of the subjects which associate themselves in most minds with this label, one would list computer science, programming logic, semantic linguistics, data processing, mathematics, information theory, systems analysis, machine translation (if it ever comes), and a few more intelligible subjects of a more traditional nature, such as statistics, report writing, and even non-traditional methods of subject indexing. His languages will be Russian, German, Japanese and Chinese, with French and Spanish a fair way behind, and Italian nowhere.

The traditional disciplines of the librarian have not disappeared altogether—they are still a basic part of humanities research—but one finds fewer and fewer librarians in responsible positions who are primarily concerned with such problems. The disciplines of the new information scientist likewise are not excluded from the domain of the librarian—he often tries to master them and frequently succeeds—witness all the whiz-kids of our profession. And of course the application of information science to the problems of the bibliographer can produce happy and startling results, as in the production of computerized concordances, or the assignment of authorship on the statistical calculations of word order and word frequency.

I should like to quote two more statements about library science, one a definition, the other a perceptive statement about the relationship between libraries and information science:

> A library, or an information system of any kind, is a trinity of (a) the atomistic, (b) content and (c) context. By the *atomistic* I mean the technology of the operation; it can be machines, catalog cards, classification schemes, or any hardware or software that will contribute to the effectiveness of the system. By the *content* I mean simply that which is transmitted, a book, a picture, a sound transcription, a message, or whatever it is that appears to meet the needs of the user and is transferred from the store to the receptor. By *context* is meant the social environment in which the system, or the act, takes place, and it is this social organization of the culture at any given time, that defines the setting and determines the character of the other two.[2]

This, by Jesse Shera, is trying to draw two worlds together; the following text, differentiates between them:

> However, library science itself was much in the same position as information science in that it has not yet adequately defined for itself a set of principles which distinguish it as a discipline among the others in the academic community. If a discipline is defined by its problems, and to my knowledge the problems of library science have yet to be defined, then library science has yet to emerge as a discipline. Hence, in recent years library science has turned back to information science as a means of obtaining the academic respectability which it lacks. But, a scientific discipline cannot be wedded to any specific institution such as the library which by its very nature is so restrictive as to preclude the possibility of the formation of the very principles upon which a discipline must rest.[3]

William Goffman, author of the second, is, like Shera, associated with Case Western Reserve University School of Library Science, and the division between the two points of view is sharpened by the similarity of allegiance, and by their contemporaneity. One can bring them together only by an artificial distinction between information science and information work or centres.

There ought not to be a dichotomy between the two areas of work. At the Library Association annual conference in 1970, two special librarians debated whether it was one world or two, and their conclusions, in separately prepared papers in separate divisions of ICI, were strikingly similar.

After discussing the differences between information officer and librarian in terms largely of choice of resources (e.g. staff vs. materials) Dr W. E. Batten answered the question 'Librarianship and information work—one discipline?' by saying 'No, not one discipline'. To which I would add: 'Not yet'. But I would also add: 'Although not one discipline, assuredly complementary parts of a single essential service'.[4] Don Mason provided his own diagram of the disciplines—more along the lines of an overlapping set of areas. He chose 'information science' as the term which embraced all 'the study of the processes involved in the exchange and correlation of knowledge', and placed this term central to his diagram. He had this to say of the dichotomy we are struggling with:

> As a general statement it is probably true to say that information workers are involved principally in information analysis, exploitation and support, and also in the editorial function; whereas librarians are involved in selection, acquisition and storage, information analysis and exploitation.[5]

His conclusion, after further considering the differences in terms of the range of subjects dealt with, is:

> The fact that there is little to choose between the services offered leads me to believe there is only one profession, though I would hesitate to give it a name.

He goes on to wonder about the professional organization of both librarians and information workers, which brings me nearer, though only slightly so, to the subject I am supposed to be talking about.

We have looked at the two prongs of library and information work in terms of what an individual would be required to know about to work in either field. Mr Mason pointed out that a majority of information workers do not apparently belong to a relevant professional body, and though perhaps an unfair observation, since the Institute of Information Scientists is a relatively new organization and is still growing, and may one day take in a majority of those workers, it does contrast the traditional membership of the Library Association by the traditional type of librarian (though even here, the historical bibliographer has tended to remain in his ivory tower with his fine bindings). The traditional librarian has a common education factor via the examinations of the Library Association or those examinations of other bodies which the LA has recognized, and however one may mock their inadequacy in the past, they have provided a common ground of knowledge. The information scientist has none of this (*pace* the Institute), and his disciplines are those of the engineering world, the mathematical world, and the linguistics world. We traditionals, who do not always understand them, wonder if they always understand each other. A humanist is apt to think that just as the study of Latin was a unifying factor in scholarship (would it were still), so all formulae and equations are open books to all scientists, just as they are closed to him, but it may not be so.

This educational background does seem to me to be one of the problems of information about information (at last!). Literature of all scholarly kinds exists in an academic world, with perhaps unseen borders between disciplines, but borders there are none-the-less. And if library science or information science, or a combination of the two, is to be an academic discipline with the advantages of a literature of its own, questions such as these, of whose language are we to use, will have to be cleared up soon. In a later section I shall have something to say about the size of our literature, but now let me just remark that it is quite small—too small to form its own academic discipline. It must establish links with larger areas in order to progress in a unified fashion. I think it would be agreed that the literature of library science is inadequate, and that progress is necessary in shaping the discipline if this will bring about higher standards of writing that can be understood by a majority of the profession. The most active sector of librarianship in both this country and the United States is that of the academic—especially the universities, and it is not unnatural that the larger field of education has seemed to some the affinity that library science literature should seek. Libraries are often said to be educational, both public and academic, and all academic institutions have libraries. But this is a marriage of convenience, or going in with big brother, as the British county libraries have done so successfully in their development over the last fifty years. But this trend is to pull special libraries away from the other kinds—and we think still, I hope, that there is more in common between kinds of library than there is between, say, education and library, or library and industry. Library science is therefore not so much an interdisciplinary study as a buffer state between two or more sets of studies, and it is suffering the fate of a no-man's land. To change the metaphor, it is the rope between two tug-of-war teams, and is in danger of breaking from the friction of its own abrading strands.

2. The internal control of the literature

Let us come down from metaphorical heights to consider why there is this conflict between traditional librarians and their way of thinking, and the information specialists who, after all, have come in to help us out with their expertise. I think the main trouble is language. Librarianship is a fairly exact study, but it has the most inexact terminology. This is why the information scientists seem more like a horde of ravaging Vikings than a peaceful party of trading Phoenicians. They speak a foreign tongue and despise ours. But what a tongue is ours: there never was a terminology that depended so on context for the meaning of a word. You cannot manipulate inexact integers in an equation; so you cannot expect scientists to respect terms that waver in meaning when you look at them too hard. We know fairly well what a library is: a collection of books or other documents organized for use. But what is bibliography? What is the difference between information work and assistance to readers—what in any case is information (but here even the scientists have no ready answer, since it can be manifested in various ways from electronic pulses to amino-acids)—how do you define the difference between a reference (at the foot of the page), a reference (to a book on the shelves) and a reference (to support a staff application), except by citing these contexts? What is the difference between reference work and information work? How do you define a public library—if it is 'open to the public', should you include national libraries, or the John Rylands Library, or the London Library? If it means paid for by the public, what about all the academic libraries and libraries of government departments? The truth is it sometimes means one, sometimes the other, and sometimes both at once. And by what definition do we exclude corner shop libraries, which, on occasions, fit either definition? Even where precise enough, the language is confusing to the outsider: a librarian knows what he means by a withdrawal, but a library user is apt to use that term for borrowing a book. We know exactly what we mean by a catalogue card, but we find it also necessary to use the term 'card catalogue', which is quite different: try inverting these in a subject index, and one is in trouble. One can only applaud such efforts as that of Pritchard, who in a recent issue of *J. Doc.* publicly rejected the term he had been using, 'statistical bibliography', on the grounds of vagueness, and confusion with 'the bibliography of statistics', in favour of the term 'bibliometrics' which more accurately conveyed what he meant, and was itself a 'hard indexing term'.[6] As indexers (both senses of the word) we should seek out single word names of things, and build up a common, exclusive vocabulary for the things that are unmistakable. The horrible term 'non-book materials' has tended recently to become 'audio-visual materials', sometimes for things such as wall charts, which are for that matter not audio at all, and no more visual than illustrated books. Dr Enright has proposed the term 'metabook',[7] but the reactions I have heard dismay me: no one is willing to give it a chance on the grounds of its difference, its indexability (without its hyphen I hope), and its fair approximation to accuracy.[8] Much of this language confusion is of course the result of confused thinking, and this is where the literature has suffered. The taking of a book by a person in a library—perhaps the most central activity you can find in the whole of librarianship—has a distressing amount of mixed verbiage attached to it. The whole operation is known as circulation control, loans, lending, charging, transactions, issuing, borrowing, and even, as I said earlier, withdrawals. The confusion lies in the shifting viewpoints—the reader borrows, the librarian issues or lends, the stock of the library is controlled or withdrawn from. These different viewpoints are valid, but they rarely match up with the use of the language. In the same way we appreciate the importance of knowing as much as possible about the use of libraries, but have we ever properly distinguished between readers, users, borrowers and members? When is a borrower a reader, or should we keep that term outside libraries in view of the confusion with other sources of reading matter? We also talk gaily about 'user needs': how can we measure needs except as a deduction from observed use? When do we know enough about use to infer needs, or should we again reject 'needs' as a question-begging term and talk instead about potential demand?

This muddle has affected the statistical assessment of libraries. There are no loan statistics for public libraries collected on a national basis, precisely because there is no uniformity between libraries in how they calculate the figures—what is included and what not. Is a renewal an issue; is an issue the record of a transaction, or can it count as two if more than one book is taken, or if two volumes of the same title are taken? These questions matter but are not solved. The stock of a library is traditionally counted in numbers of books, of pamphlets, of periodicals, of other material such as microfiches: but do you count titles or volumes? when is a pamphlet not a book? do you count periodicals in titles taken or volumes held? (how do you count a volume when parts are not numbered?) and do you count microfiches by the individual slip, by the titles represented, or the equivalent of volumes included? These questions were found so irreconcilable at a Unesco conference to settle the form of international statistics, that the only agreed way of measuring library stock was found to be metres of occupied shelving, with an allowance for what was on loan. This was not so crazy either, since it enabled the British Museum to report a stock figure for the first time, and perhaps others will come round to seeing it as a valuable comparative measure. This is one way in which libraries and librarianship lack respect. Every week I am asked how many libraries there are in the United Kingdom, and every time I have to find out what the enquirer means by library, and ultimately to confess that I do not know exactly, whatever definition they choose, but they can have a few guesses based on unrefuted estimates.

Thus one of the problems of library science is the muddle arising from the lack of an agreed language. This is all the more inconvenient, since libraries contain books and other material on all subjects. The indexing of library literature requires that these subjects are sometimes stated. I have the task of subject indexing the additions to the stock of the LA Library, among other chores, and in this work I am trying to compile an authority file (for a chain index) which I call a subject headings list, but which some would call a thesaurus, which will allow hard terms for library matters, and at the same time allow other subject terms to remain distinctive. It is very difficult, since a subject index cannot include very much in the way of context, or 'roles'. It is easy enough with such headings as 'Medicine: libraries', though here you note that natural language 'Medical libraries' has been lost, but when a subject such as 'education' or a concept such as 'research' is dealt with, the headings can be no more than arbitrary selections from the possible headings in which sometimes the term 'education' or 'research' has to do with library education or library research, and sometimes not. Being pervasive in this way, and covering all the rest of knowledge, library science has another worry.

A word about classification. A sign of a well developed subject is its amenability to classification. The schedules of botanical classification have readily been adopted for book classification of works on botany, though of course additional schedules are always needed for practical arrangements. Any commonly accepted way of ordering aspects of a subject recommends itself to all library users when they encounter it, but can this be said of library science? After what we have had to say about language, it is not very likely. The Dewey Decimal Classification devotes one-hundredth of its schedule capacity to library science, and for a long time these schedules were adequate. They represented a division between library operations and types of libraries. But of course in the development of subdivisions these distinctive divisions were blurred. A book on cataloguing in university libraries would be placed in the operations section under cataloguing, and in a browse along the shelves would be lost by the reader requiring a general survey of university library methods, although of course the added entries in the catalogue would redress the balance. Apart, then, from the impossibility of combining subjects as opposed to making added entries, Dewey had a methodological approach to the subject which was basically sound. In general, library operations are the key to librarianship. The UDC of course followed this lead. Where matters went wrong was in the treatment of unconventional methods of indexing, which occasionally got into 029 ('literary methods–book indexing'), and sometimes into 010.78 ('information retrieval'). I have not seen the new 18th edition, which seems to have turned things round a bit, but one has only to scan BNB to see that one cannot expect everything in 020–029 to be relevant to library science. There are lists of recommended books for this and that, where one would have expected only works on how to deal with book selection, and there are a number of works on archives, which these days are hardly relevant. Computers have been dodging about and seemed to have settled under office methods at 651.84, but are away again to 001.64, while the theory of communication has rested at 001.5 (formerly 384), which is uncomfortably near to flying saucers (001.9), and a little oddly placed with relation to humanities at 001.3. The library science librarian can be forgiven then for thinking his subject has gone to pieces in Dewey.

In Bliss' scheme the same basic order of process followed by type of library is obscured by the setting of librarianship as a whole under the general heading of bibliography. The initial concept here is the book—its production, purpose, organization (in bibliographical control as well as in libraries) and exploitation. Dewey kept bibliography away from library science. Bliss' consensus seems to have let him down here, since his order, though rational, does not take account of the way books are used in libraries. And one notes that the whole schedule is at the end of the scheme, not as in Dewey, very near the beginning.

Library of Congress, also placing library science with bibliography—between book production and bibliography proper—and also making it the last main schedule of the scheme, has less attention to give to its intricacies, and the treatment is very much more a reflection of the convenient way of arranging by format such books as were in stock. But type of library—grandly subdivided by type alphabetically (commercial, county, dental, depository, etc.)—came before library operation, misleadingly placed under the caption 'the collections', and the schedules conclude with 'library reports' and 'library catalogs'.

There is, as some of you will know, a special classification scheme for library science, constructed on the principle of faceted analysis, by members of the Classification Research Group. I say there is, but it would be nearer the mark to say there are. The scheme published in a preliminary draft edition in 1965 by Aslib[9] was adopted by the LA Library, by the libraries at NWP [now the Polytechnic of North London], Aberystwyth and Leeds Library Schools, developed as need arose by all three institutions independently, and adopted also by *Library and Information Science Abstracts* when it started in 1969. In the meantime a research project to complete and correct where necessary had been funded at NWP, and we await a final version. *LISA* has become dissatisfied with its use of the scheme, and in 1971 has adopted an intermediate version between NWP's latest draft and what may be the final version. The trouble arose on two counts—the need to expand rudimentary schedules and lack of a clear decision on whether processes or provision should take priority. The 1965 draft opted for library provision—type of library by user-cum-owner taking precedence in citation order, while the latest draft being used by *LISA* has chosen to cite library process first. Historical opinion is in favour of the latter, from our examination of Dewey and Bliss, but it is very much a moot point. The dichotomy is again rearing its head as to whether librarianship as the study of institutions collecting material together is the core, or whether it should be the technical operations that go into achieving this result.

To summarize this little excursion in terms of problems of library science literature, we can say that there is no expected body of literature that can be isolated as library science: it will be intermingled in libraries with works on bibliography, with bibliographies themselves, with material on the book trade, and with examples of library publishing and catalogues. If one requires an idea of how the outside world sees librarianship, one can study any antiquarian bookseller's catalogue, and see what he subsumes under the heading of bibliography, or the even vaguer heading 'books about books'—which can even include what we would almost unanimously term literary criticism.

3. External control of the literature

This third section of my talk is probably what one would expect to find under the title 'library science literature', and in it I shall mention some of the patterns of publishing and media of communication that seem to be significant or that give rise to problems.

I mentioned earlier that the literature on library science was not large. This is so in comparison with many scientific subjects, but it is still large enough for existing resources to have to be stretched to their utmost to cope with it. Corrigan estimated in 1968[1] there were some 10,000 documents per year, but I regard this as an over-estimate if one is to be at all selective. One should cut out most reviews, many minor reports, and each country will exclude from consideration the minor writings in native languages of countries that are least closely related to it in general culture. I would put the number at nearer 6,000. In this number I am including British and American published books and pamphlets, periodical articles from the major journals from all countries, a selection of the major works in German, Russian, and other significant languages (the Scandinavian languages are more important for library science than for many other subjects), and a large quantity of limited circulation English language British and American report literature.

The literature was large enough for the Americans to sponsor a conference in 1968 on the bibliographical control of library science literature. Corrigan and Whatley went from Britain, and the Short summary was duly published,[10] though no full publication of papers has yet been made. An ironic fate, since it added ten to the number of partially published papers in library science that one of the participants—Corrigan—was so concerned about.

The coverage of library science literature in abstracting and indexing journals has been studied before: by Corrigan in his 1968 paper, by Whatley in his 1966 survey of international schemes,[11] and notably by Alan Gilchrist[12] (his presence here is one reason for my not treading too heavily on this ground, since I am sure he can tell you more about this subject than I can). I have a typescript of an article which he is having published in the May issue of *Aslib Proceedings*[13] in which he finds that comparing the three journals *LISA*, *Referativny Zhurnal 59*, and *Information Science Abstracts*, only 51 journals are common to all three in the last two years' production, and yet a total of over 450 titles are covered by all three, each service yielding coverage of between 240 and 310. There is a larger measure of common ground between *LISA* and *Information Science Abstracts* (98 titles) than between *LISA* and *Referativny Zhurnal 59* (70 titles), while *Information Science Abstracts* and *Referativny Zhurnal 59* have 74 titles in common. A very regular triangle it seems. And this lends point I feel to my suggestion that library science and its related subjects are not so much concentric as overlapping. It would have been interesting (though not very) to have a fourfold comparison including the indexing service *Library Literature*, to see if any national differences on the same avowed subject of library science appeared in the comparative coverage of titles in that service. One point which Alan Gilchrist brings out very clearly indeed is the success so far (1969 and 1970) that *LISA* is having in covering material promptly. The mean delay is near to the target of three months (99 days in fact), compared with about twice the time for *Referativny Zhurnal 59* and an unconscionable average of well over a year for *Information Science Abstracts*. I made a random check in one 1970 issue of *Information Science Abstracts*, which showed that less than half the articles bore a date within a year of the publication date of the issue (and even then the issue had arrived at the LA six months after its cover date). *Information Science Abstracts* is useful, but not for current awareness. However, as a profession we are not serving ourselves too badly in abstracting from periodicals: the cobbler's children have at least one decent shoe to wear. A word of warning, however, which relates to what I said earlier about the size of the operation. This is now a co-operative service mounted by the LA and Aslib, with a full-time staff of two-and-a-half at the LA, plus approximately one to two full-time members preparing abstracts at Aslib. Then there is the cost of the actual publishing operation which has to be added. With 2,800 to 3,000 abstracts a year, somewhere near 40 per cent have to be translated from foreign languages, and not a few translated from the author's own fond idea of what an author abstract should be, while the remainder are to be abstracted from the beginning. To transfer this sort of operation from the field of the amateur to that of the full-time professional costs money. *Library Science Abstracts* cost £3.15 per annum for 1,250 abstracts (less current and less well indexed) in 1968; *LISA* cost £6.30 for 2,500 abstracts in 1969, and in 1971 is to cost £10 for the 2,800–3,000 on inferior paper and in nearprint instead of letterpress. Sales are quite good: about 2,200 subscriptions, with a majority going outside the UK. The machinery is there to increase the content of *LISA*, but this cannot be done without either an increase in sales or an increase in price even beyond the quite heavy increases that have already had to be made. This is one reason why one looks to another discipline to assist: the base of subject matter is not of sufficiently wide appeal to achieve adequate sales to maintain a fully professional operation on editing. The present editor, merely through professional pride, has worked countless hours of overtime in order to make the publication presentable, but one does this at the start of a new venture: one does not do it forever, and I would warn anyone against thinking there is no problem, because for the moment we have an abstracting service that we can rely on. Of course many people are far from satisfied with it—mostly because of its classification and indexing methods. Largely I believe they are people who are professionals *manqué*—unwilling to believe that their own subject needs structuring in the way that they are ready to believe necessary for chemistry or other respectable disciplines. I mentioned the difficulty of constructing a vocabulary in library scheme. A well-meaning but, in my opinion, misguided writer suggested the possibility recently of a KWIC index for library literature—and like most American librarians she ignored foreign tools and looked only at the headings of *Library Literature*, the Wilson index, to see if the headings were sufficiently commensurate with the title words. She seemed to be satisfied, but then she was assuming that the *Library Literature* headings were adequate.[14] Anyone who has used *Library Literature* for subject approaches will realize the futility of such a judgment. Whatever the troubles that *LISA* will go through—and there must be teething troubles—I for one am convinced that a structured approach to the subject indexing, via a classification scheme, is necessary. It is already a temptation in my work at the LA to search for journal articles only in the last two years of *LISA*. Searching in *LSA* requires a delicate touch of serendipity that is not at everyone's command.

But this measure of self-satisfaction extends only as far as the periodical literature. The monograph situation is frankly terrible. I have no reliable estimate of how many worthwhile pieces of work appear in the course of a year, but I would hazard a guess that including foreign material it is over 1,000. In the LA library we add between 2,000 and 2,500 items, but not all of them are new that year, and we have a way of counting a periodical article as a monograph if it comes from a title we do not permanently store. On the other hand, we keep adding to a pile of uncatalogued foreign items, which await time available for their treatment. Now to acquire this number we have all kinds of arrangements: exchanges with Eastern Europe—monograph for monograph, and title for title; a blanket order with a West German bookseller for all titles on approval that he thinks might be relevant; and I personally scan an uncounted number of periodicals (probably 150) to see from the announcements, reviews, advertisements, even references at the ends of articles (though that cannot be done properly) what has been written that is relevant. Another member of staff scans a score or so German and Scandinavian titles with the same purpose. We take all ERIC/CLIS microfiche, look through *Research in Education* for non-CLIS reports, and just about any other source we can think of. But every week requests still filter through of titles we have never heard of. *BNB* lists no more than 150 titles per year in the 010 and 020 class numbers, and by the time we see *BNB* most of these are on order already. *Publishers Weekly* yields a few more, but most come from the back street sources. Of course, if all this work is going on, it ought to be put to use, even though belatedly, and this is attempted. When catalogued, every item goes into our *Library and Information Bulletin* but that too is in arrears—I would hate Alan Gilchrist to make a 'mean delay' check on that title. By rights this information ought to go into *LISA*, but that means more expense, so for the time being it goes into *Library and Information Bulletin*, and batches of additions have to await the preparation of articles that can carry the front matter and make it interesting enough to pay for the cost of letting people know—in arrears and at second hand for the most part—what exists in their subject.

Why this inadequacy of *BNB* and *Publishers Weekly*? For it is mainly English and American works that make up the 1,000 main items. There are many answers, all of them hypothetical. Here are a few. The subject diffusion (scatter if you like) works against library science turning up mainly in a known group of commercial publishers; subject slant in a documentation title may lead to its being placed elsewhere in the Dewey schedules; many titles are semi-published reports, not committed to any regular series.

The report problem is a bad one, and is fast getting worse. I believe it stems from the desire of librarians to communicate (not peculiar to that profession), but the urge to make communication is more easily gratified, since librarians are closer to the means of production and dissemination than many other disciplines. We have seen the result: apart from our two associations, whose publication policies are of respectable antiquity, there are librarians publishing from universities—Lancaster, Loughborough, Southampton, Belfast (until Aslib took over and regularized *Program*), Newcastle; and from other groups—Leicestershire County and Bromley to name a couple. The library schools have begun their own publications: Sheffield, Aberystwyth and NWP especially.

One finds librarians unblinkingly ready to go on adding to the literature deluge, as in this extract from a recent article:

> Librarians have always been faced with the task of publishing their own in house necessities—material too ephemeral or too limited in appeal to attract a commercial publisher and material which must be disseminated quickly. From this type of publishing, it is but a small mental jump to publishing bibliographies, guides to the literature of various disciplines, or state-of-the-art reports. Nor is it difficult to envision libraries publishing material in the field of library science. What may be somewhat more incomprehensible is a library publishing materials completely unrelated to the library milieu (as unrelated as a book could be) such as a book on finance, a book of poetry, or a paper on computer-assisted instruction.[15]

But the conclusion is in favour of going forward: 'why should they back away from a full-scale assault on the publishing medium? . . . You have nothing to lose but the fetters on your image'!

In the professional associations there are non-headquarters groups, sections, divisions and branches, and such is democracy both here and in America that it is common experience for the headquarters not even to know of the existence of some publications. I recall being asked some years back by our Publications Department about a new title they had been asked for and did not recognize. After thinking a minute I suggested a source as possible, only to realize a moment later that the title was in fact a set of papers at a lecture course which I had edited myself, and which had now appeared without anyone telling me, some two years later. Since this is far from being a unique experience even in my limited publishing output, one wonders how much of what is published comes with the final blessing of its originator. In the LA we are rather prolific with groups and sections—new ones have appeared regularly every year recently—and one wonders if that awful point has been reached yet, which was so eloquently described by Michael Frayn in *The tin men*, when the complex of committees, sub-committees and working parties and the like went critical overnight and began spontaneously generating offspring without any prompting. The LA produces I think over thirty periodicals of varying stature and it is sometimes very hard for us in the Library to get on to their mailing lists.

One of two factors is at work here: either librarians are more garrulous than other men (and I seem to be making a point in favour of that argument), and like seeing their garrulity in print; or they are more concerned to preserve what has been recorded, however ephemerally. Certainly the requests we receive at the LA Library include some odd anxieties to read what might have been better repressed. One has only to see a mention in an article footnote that some private circulation papers were used in the preparation of the document, for us to know that someone else will certainly ask us to lend them. And this of course makes us add to the demand by requesting them in advance. Perhaps librarians are just more inquisitive than other men. It is certainly a useful attribute in the profession at times.

People talk about the information explosion, the knowledge explosion, the paper explosion and the like, in most instances—in my opinion—making too much of a natural increase. In library science, though, I think we have had an explosion of a different kind—a large growth disproportionate to the previous level of increase—and I would call it the grant explosion. In the last six years

OSTI has shone an aura of possibility over all the pipe dreams of library researchers and very many projects indeed have been very well funded, by comparison with what went on before. But there is a feeling that OSTI, having caused the explosion which blew away the clouds of despair of ever getting anything done, ought now to be marshalling its resources less indiscriminately. The reports occasioned by the money are now coming home to roost, and can any clear policy be seen behind them? I think not, except to keep research work within certain subject fields. Information is a vague term and OSTI have not dissipated that vagueness: they may say it is not their concern to do so, and perhaps we are special pleaders in asking them to consider libraries more than other information handling organizations. It seems that research in librarianship is to be like that in all other fields—conditioned not by need but by opportunity. This is true of library science publications, but before I go on with what will be the last paragraphs of this already too long talk, I must just throw another stone at OSTI. In their *Newsletter* they are helpfully listing the projects completed under the titles given them in the final reports. And they have assigned each a number. Unfortunately the numbers are assigned after the report has been written, so many of the copies prepared by the organization reporting do not carry any series number, and sometimes the organization has other plans for publishing the work, as with the LA's *Planners and information,* which is a reprinted version of OSTI report number 5059 under the title *Information provision in town and country planning.* Perhaps it is time that OSTI had some more librarians on their staff to advise on proper bibliographical control, and the priorities of library research. It could then rely more on its own internal judgement, and less on the unpredictable opinions of its referees.

Proliferation of reports could be moderated I think by some measures well within the control of the profession itself. It should not have escaped notice, that, in the United Kingdom at least, the major organs of periodical literature are in the hands of the two (or three) associations: *Library Association Record, Journal of Librarianship, Aslib Proceedings, Journal of Documentation, Program, The Information Scientist.* In library science there is very little of importance outside this number: how much do *Library World* and *Library Review* contribute to the publication of new work? Even the abstracting journal is jointly run and totally within professional control. Personally (and this cannot be taken to be LA policy speaking, although I will do what I can to make it so) I feel there are either not enough solidly based journals, or that those there are are too slim for the quantity of material that is obviously ready to be published. If the reporting of a project in *J. Doc.* or *J. Lib.* carried the cachet that *Nature* gives, much of this ephemeral publishing would be better refereed and given a better home. Perhaps the existing journals are not the proper vehicles for this type of work, but I feel sure that something could be worked out within the profession.

With all this wealth of literature there are still inadequacies and gaps. We have no satisfactory directory of libraries, although there are many—so many that there is even a British Standard on how to prepare directories of libraries; there are very few manuals and compendia of information on the basics of library techniques—the Aslib *Handbook* is an honourable exception. This type of work should be commissioned in the way that Unesco commissions works—

but produced to UK requirements. A certain confidence in the way British librarians run their libraries should not be out of place and some works could be commissioned in the belief that they would find a ready market internationally. This would need generous payment—secondment from regular duties—since the experts required are usually the busiest and with least time for writing. Something like this will I hope appear with Havard-Williams' forthcoming work on university library buildings. The secondment was all too brief a sabbatical in this case, and did not allow for completion of the work before he had to be back at the bench, but when it does come out, I think I can say it will not be yet another incomplete set of opinions and half-digested experience.

How to summarize all this? The best answer is not to bother. But I have tried to show how the present state of library science literature is conditioned by unsatisfactory circumstances: lack of a clear and accepted content of the discipline, which is partly caused by a disunity in the profession amounting to a doubt whether it is one profession or two or more; lack of precision in language, which has led to the scientists who have interested themselves in our problems being less able to understand our methods than they should be, and thereby to their importing their own less appropriate or less intelligible terminology; lack of agreement on how our discipline is structured internally, as evidenced by diverse classification; lack of adequate announcement media or bibliographic tools (excepting temporarily *LISA*); and lack of adequate primary publication sources: hospitable and reputable journals, or firmly based and comprehensive research report series. These lacks add up to my view of library science literature: this is my world and welcome to it; these are some of the problems of information about information.

Note: I have used the term 'discipline' throughout to refer to an area of study. Mr D. W. Langridge has suggested that this is an inappropriate usage, since disciplines (scientific philosophical, historical, artistic, etc.) are modes of study rather than areas. While welcoming this distinction, I have found it impossible in this paper to adopt it, since I can offer no substitute.

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SOME QUANTITATIVE ASPECTS OF FEATURE CARD SYSTEMS: RESULTS OF A QUESTIONNAIRE

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Introduction

IT IS, of course, unusual for an author to begin his paper with acknowledgements but I have elected to do so because, although this paper has only one named author, it is in fact the work of a group of people, namely the Committee of the Aslib Co-ordinate Indexing Group. The idea for the project, the style and format of the questionnaire and the basic method of processing were all arrived at in committee. My contribution was to distribute the questionnaires, process the returns and to agree to publish the results. I offer to the other members of the Committee my sincere thanks for all the work that went into this project.

Background

The project arose out of discussions which took place during a meeting of the Aslib Co-ordinate Indexing Group on 23rd March 1970. The Group had met to discuss what research was needed in the field of co-ordinate indexing and it was suggested that it would be valuable to members, especially those at present developing new systems, if they could obtain some idea of how existing systems were being operated. In committee, it was agreed—despite the known shortcomings of postal questionnaires—that all we could hope to do at that stage was to distribute such a questionnaire and design it to be as simple and unambiguous as possible. It was also agreed that, should this questionnaire project meet with a reasonably successful response, we might consider a more detailed study at a later date. Discussions are now in progress for a further interview plus questionnaire project, under the auspices of Aslib, to be conducted during the later part of 1971.

The questionnaire

As already stated, it was agreed that the questionnaire should be designed to be as easy and quick to complete as possible in the hope of achieving a high percentage of replies. It was agreed, wherever practicable, to adopt the technique of offering a choice of ranges of figures which only required a tick in the appropriate box (see Appendix). Unfortunately, the returned questionnaires showed that we had not been entirely successful in our attempts to avoid ambiguities in the phrasing of the questions and this must have affected the value of some of the results.

Distribution

The distribution of the questionnaires was as follows:

73 copies to members of the Aslib Co-ordinate Indexing Group.
33 copies to information units known or thought to be operating co-ordinate indexing systems.
8 further copies sent by request to units operating more than one system.

Of these 114 copies distributed, 6 were sent to individuals for information only, i.e. they were thought to be interested in the project but not operating a system and could therefore not be expected to return a completed form.

No evidence can be offered that this distribution covered a major proportion of the systems in use in the country to-day. However it is hoped that the systems included in the survey form a representative collection of the total number of systems.

Returns

Of the 108 questionnaires distributed to anticipated operating systems, 62 (57 per cent) were returned completed for processing and 11 were returned as not applicable, giving a total return of 73 (68 per cent). Bearing in mind the method of distribution, i.e. that it was not known how many of the recipients operated systems of this type, I consider this a very encouraging response.

Results

Since the questionnaire did not ask, in the main, for exact figures it would be meaningless to attempt to produce exact averages for the operations concerned. Instead, it was decided to produce distribution histograms for the range of figures given. Obviously, not all the operating systems are strictly comparable: for example, one might anticipate that indexing time for abstracts might well be different from that for larger documents, so the results have been processed in two parts; firstly, by taking all the questionnaires together regardless of possible interacting aspects, and secondly, by comparing only like systems in an attempt to obtain some rough average figures. No attempt was made to examine the statistical significance of these results. It is hoped that this can be done with any subsequent 'in depth' study of the subject.

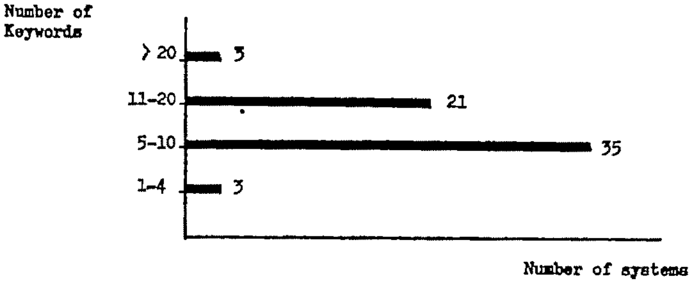
PART A: ALL QUESTIONNAIRES

Section 1. Categories of input material

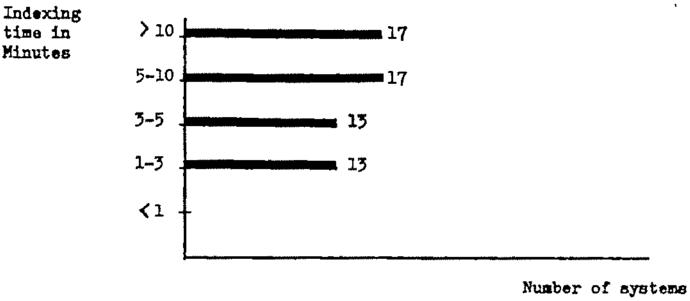
This question was inserted mainly to be taken in conjunction with Section 3 on the basis that different sized input documents might well require significantly different indexing times. However, it may be interesting to have some idea of how the input to the systems is divided.

Of the 62 systems under examination, 11 (18 per cent) had an input consisting mainly of abstracts; 1 (2 per cent) had an input consisting mainly of news items; 2 (3 per cent) of correspondence; 2 (3 per cent) of brief one page documents; and 32 (52 per cent), of larger documents, mainly journal articles. 11 (18 per cent) had a mixed input, and 3 (5 per cent) had an input not fitting any of the stated categories (curiously all three were photographs).

Section 2. Number of keywords per item



Section 3. Indexing time



Section 4. Drill or punch

This question was designed to be used in conjunction with Section 5 since it is unlikely that holes can be made in a number of cards at one time by a punch. However, of the 59 systems using conventional drill or punch equipment, 28 use a drill and 31 a punch.

These were divided as follows: 24 were non-powered, hand operated; 2 were powered, hand operated; 30 were powered, with position located by external register; 2 were automatic, i.e. 80 column card; and 1 was a Dura mach 10 automatic writing machine.

Division between the equipment manufacturers was as follows: Anson 14, Royal McBee Keydex 13, Ekaha 5, Research Engineering 5, Visiscan 4, Termatrex 3, IBM Port-a-punch 2, La Phototechnique 2, ICL Power Samas 1, Moore and Wright 1, Shell (own design) 1. (Care must be taken in interpreting the significance of these results since no claim is made that this is a true penetration of the market for equipment, especially as many systems must be operated by organizations who are not members of Aslib.)

Section 5. Method of punching

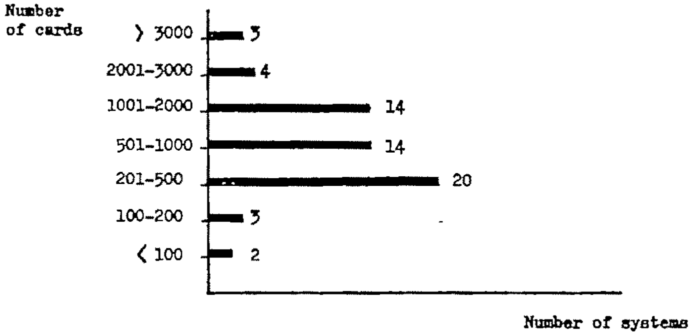
These were divided as:

Single punching through multiple cards—32;
Multiple punching through single cards—27.

Curiously, of the 27 systems using multiple punching operations through single cards, only 9 reported using transfer sheets. This may have been due to the use of word lists thought to be too large to make transfer sheets a practical proposition.

Section 6. Card packs

Number of feature cards in each pack



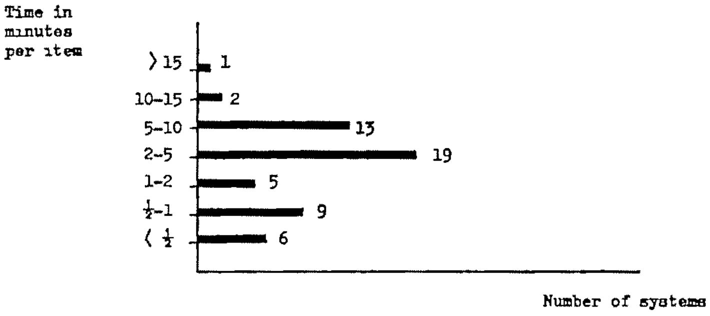
The capacity of the feature cards used

10,000 hole cards were by far the most popular with 44 systems; 9 systems used 5,000 hole; 4 systems used 1,000 hole (two of these were stated to be 80 column cards); 2 systems used 2,500; and 2 used 7,500.

Number of card packs

Thirty-five systems were still on their first pack of cards, thirteen had 2 packs, five had 3, two had 4, one had 8, one had 17 and one had 18 packs.

Section 7. Punching time

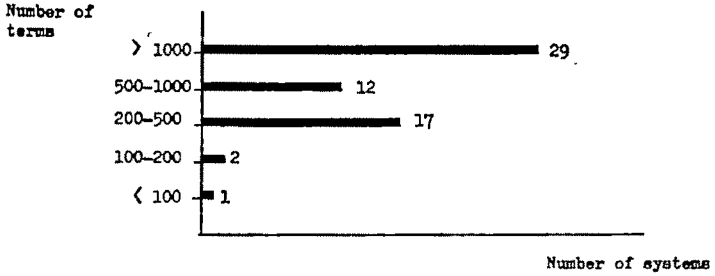


Section 8. Thesaurus

No system reported using an externally published thesaurus without modification. 13 systems use a published thesaurus supplemented by in-house terms (Engineering Joint Council, 4; American Petroleum Institute, 6; British

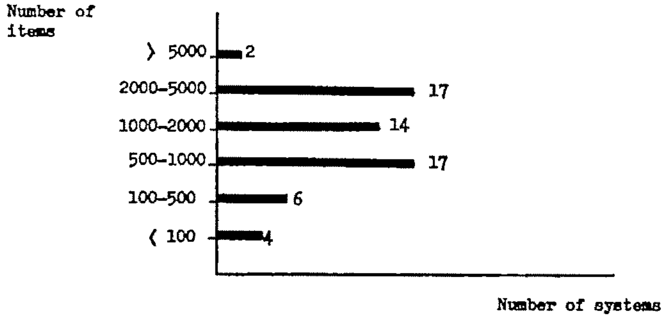
Institute of Management, 1; 2 did not state which). 49 systems use a thesaurus developed within their own organization. A number of organizations reported having constructed an in-house thesaurus after first consulting a published one.

Number of indexing terms in the thesaurus



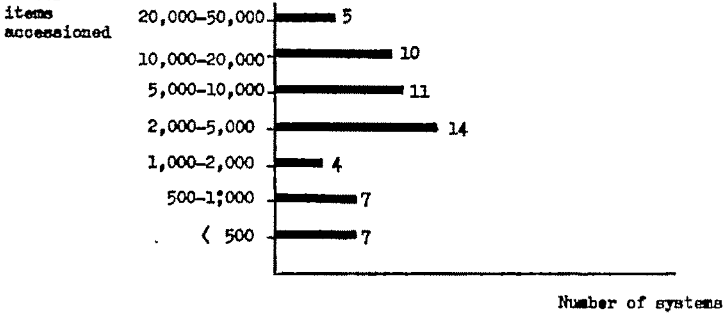
Section 9. Input to system

Number of items input during the previous 12 months



Number of items accessioned into the system

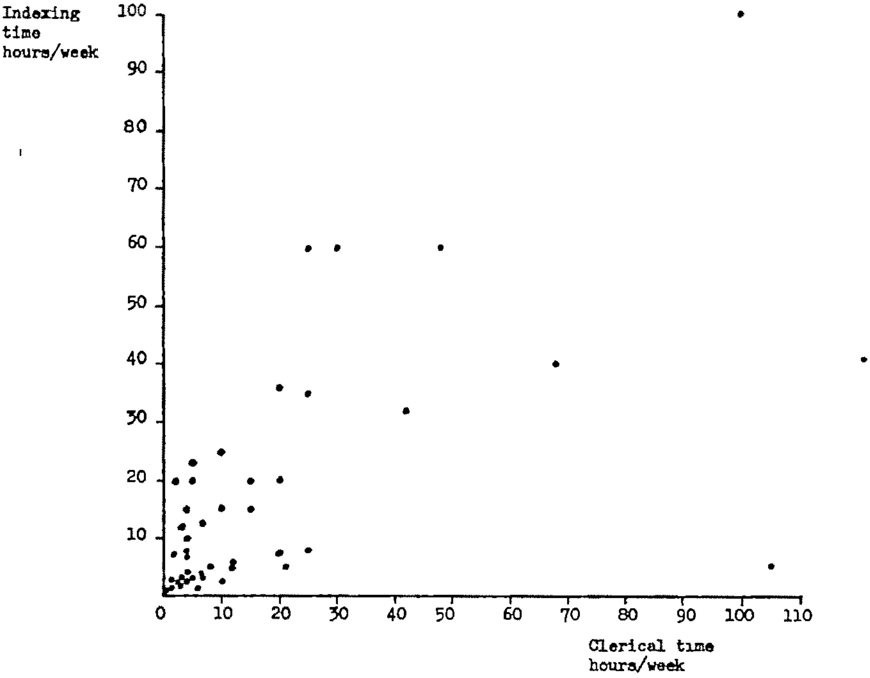
The questionnaire asked for actual numbers since the likely ranges would be difficult to guess. From the figures supplied ranges were taken to produce the following histogram:



Section 10. Staff effort

This involved time spent per week on intellectual aspects such as indexing. The figures supplied against this question varied from half an hour to 100 hours with an average of 16 hours.

Time spent per week on clerical aspects such as punching, etc. varied from 10 minutes to 100 hours with an average of 16¼ hours. The following 'scatter graph' gives some idea of the widely different times estimated by the respondents. Unfortunately there was some confusion due to the rather vague phrasing of the question and respondents had difficulty in deciding whether to include, for example, time spent on selecting articles from the literature.



Section 11. Problems with systems

6 questionnaires reported problems of card dimension stability; 15 questionnaires reported problems of printing errors on cards; 1 of excessive mechanical wear of equipment; 4 of excessive wear on cards; 1 of poor hole drilling; 1 of location of correct position for punching; 2 of error correction in punching; 1 of filing of cards; and 1 of operator fatigue during punching.

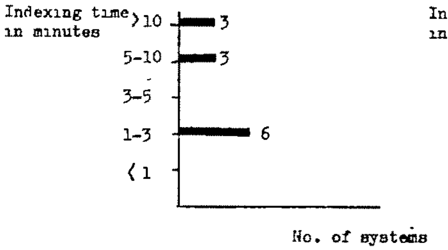
Section 12. Multiple copies

Only five systems reported preparing multiple copies of feature card packs.

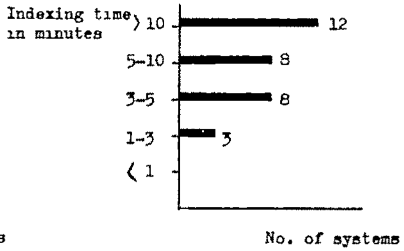
PART B: INTER-RELATED QUESTIONS

Section 1/Section 3

Since it might be supposed that the time taken to index an item could be related to the amount of text, two groups of questionnaires were separated, the first being systems processing mainly abstracts and/or news items and the second processing multi-page documents. There were insufficient replies in the other categories to produce meaningful histograms.



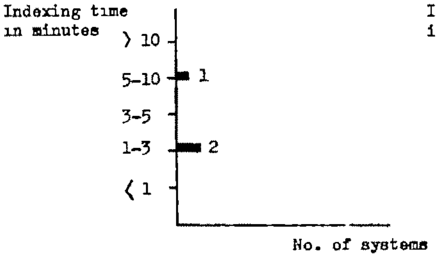
Abstracts and/or news items



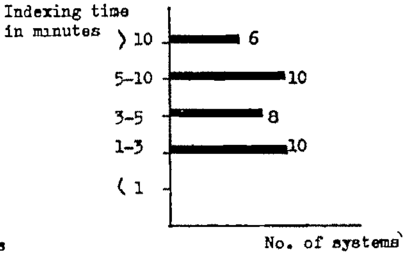
Multipage documents

Section 2/Section 3

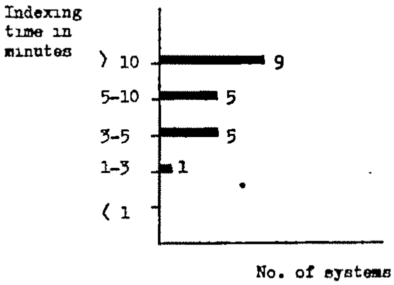
It might also be supposed that the amount of indexing time is related to the number of keywords allocated, so the questionnaires were divided into groups, according to the numbers of keywords allocated per item, and again indexing time histograms were produced.



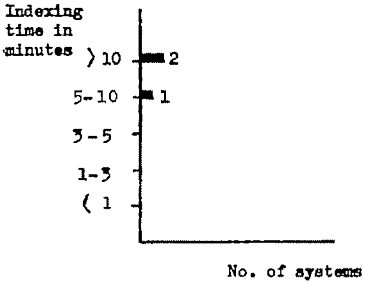
1-4 keywords



5-10 keywords



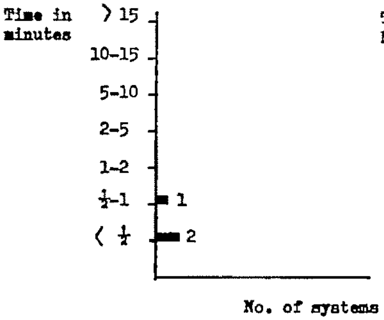
11-20 keywords



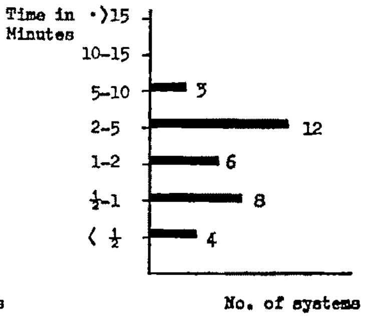
over 20 keywords

Section 2/Section 7

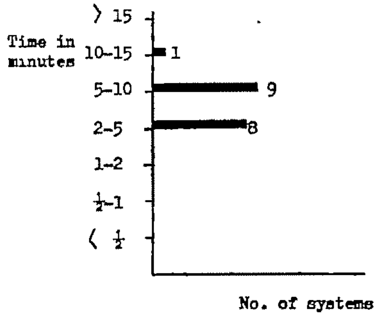
Since the punching time should be directly related to the number of keywords allocated, the procedure adopted in the previous relationship was repeated for Sections 2 and 7.



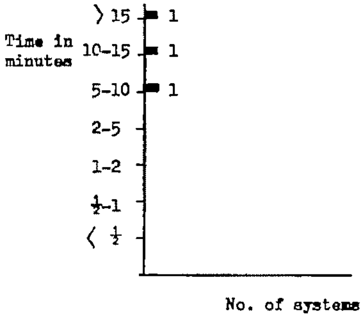
1-4 keywords



5-10 keywords



11-20 keywords



over 20 keywords

Section 4/Section 5

It was thought that it might be of some interest to determine how many of the organizations which have the ability to drill several feature cards at one time actually elect to do so.

32 questionnaires reported using powered equipment and in 19 cases the equipment was used to drill a number of cards simultaneously. Of the 13 users of powered equipment who drilled one card at a time only 3 did this because they used transfer sheets.

Section 9/Section 10

One of the most practical inter-relations is that between the average input in items per week and the amount of staff time spent per week. The following table gives some idea of average times. Where the number of questionnaires in a section is considered too small to be significant this is indicated. It is also considered that the column in the input range of 10–20 items is unfairly biased by one system estimating 100 hours for both clerical and indexing time. In this case, the figures given in brackets are those excluding this abnormally high reply.

			INPUT IN ITEMS PER WEEK					
			Under 2	*2–10*	*10–20*	*20–40*	*40–100*	*Over 100*
WORK EFFORT PER WEEK	*Indexing Time* (*Hours per week*)	*Min.*		1	1	.5	2.5	7.5
		Max.		7.5	100(36)	32	60	15
		Avr.	20 (1 only)	4	17 (11.4)	10.3	24.5	11.25 (2 only)
	Clerical Time (*Hours per week*)	*Min.*		.5	1	2	2.5	10
		Max.		12	100(25)	105	68	20
		Avr.		3.6	14.3 (6.9)	24.5	22.3	15 (2 only)

Conclusions

PART A

Section 2: The majority of systems allocate around 10 keywords per item.

Section 3: An average overall indexing time per item is around 10 minutes.

Section 4: As far as equipment is concerned, organizations either use a simple hand punch or a sophisticated powered drill with little use being made of the intermediate powered hand operated drill.

Section 5: The division between one drilling operation through multiple cards and multiple drilling of single cards is approximately equal.

Section 6: The number of cards in each pack varies between 200 and 2,000 in the majority of systems. 10,000 capacity cards are by far the most popular.

Section 7: The overall average punching time would seem to be around 5 minutes per item.

Section 8: The majority of systems use a thesaurus developed within their own organization and no organization has found an unmodified published thesaurus satisfactory for its indexing. Few systems use a small (under 200 terms) word list.

Section 9: The average input per year seems to be around 2,000 items. There is considerable variation in the total number of items in the collections.

Section 10: There is considerable variation in the time spent per week on each system, with an average of 16 hours spent on indexing, etc. and the same time spent on punching.

Section 11: Apart from printing errors there were comparatively few complaints of equipment failures.

Section 12: Few systems prepare multiple copies of card packs for distribution.

PART B

Section 1/Section 3: Using ranges of times and histograms, it is not particularly easy to draw definite conclusions but it would appear to take around 5 minutes to index an abstract and 10 minutes to index a multipage document.

Section 2/Section 3: Within the accuracy of the system used, it would seem that:

Using up to 4 keywords produces an average indexing time of about 3 minutes per item.

Using 5–10 keywords produces an average indexing time of about 5 minutes per item.

Using 11–20 keywords produces an average indexing time of about 8 minutes per item.

Using over 20 keywords produces an average indexing time of about 12 minutes per item.

Section 2/Section 7: Using up to 4 keywords takes an average punching time of around half a minute per item.

Using up to 5–10 keywords takes an average punching time of around 2 minutes per item.

Using up to 11–20 keywords takes an average punching time of around 6 minutes per item.

Using over 20 keywords takes an average punching time of around 15 minutes per item.

Section 4/Section 5 and *Section 9/Section 10*: No further conclusions than those already indicated.

I should like to end by sounding a few notes of warning, especially to any reader currently engaged in establishing a new system:

(1) The conclusions stated are those of the author only. Bearing in mind the inaccuracies inherent in the use of postal questionnaires, they must be examined in the light of each particular system and certainly should not be applied indiscriminately.

(2) The times, when quoted, are mainly estimates from single operations and it is extremely difficult to relate these to a real working environment. I might hazard a guess that if a single timed operation takes five minutes then it can be anticipated that between four and six such operations can be accomplished in a normal working hour.

(3) The Co-ordinate Indexing Group Committee are most anxious to stress that readers unfamiliar with the techniques involved should not assume that because a majority of the respondents use any one particular technique then that is the only correct one.

Acknowledgements

In addition to the acknowledgements with which this paper opened, I should like to thank most sincerely all of the respondents who took time off from their many normal duties to complete the questionnaires.

APPENDIX

QUESTIONNAIRE NO. . . .

Section 1. Type of document processed

How is the input to your collection distributed between the following categories? Please indicate rough percentages.

(a) Abstracts
(b) News items
(c) Correspondence
(d) Brief, one-page type documents (other than (c))
(e) Larger documents
(f) Any other category. State which . . . . . .
. . . . . .
. . . . . .

Section 2. Number of keywords per item

How many key-words do you allocate, on average, to each item?

(a) 1–4
(b) 5–10
(c) 11–20
(d) over 20

Section 3. Indexing time

How much time does each item take to index?

(a) Under a minute
(b) 1–3 minutes
(c) 3–5 minutes
(d) 5–10 minutes
(e) over 10 minutes

Section 4. Equipment

Is the equipment used a drill?
or a punch?

Which of the following categories describes best the drill/punch?

(a) Non-powered, hand operated
(b) Powered, hand operated
(c) Powered, with position located by external register
(d) An automatic punch, e.g. 80 column cards
(e) Other systems . . . .
. . . .

Name of equipment or manufacturer . . . .

Section 5. Method of Punching

Which of the following systems do you use?

(a) Single punching operation through multiple cards
(b) Multiple punching operation through single cards

if (b) do you use transfer sheets?
Yes
No

Section 6. Card packs

How many feature cards do you have in one pack?

(a) less than 100
(b) 100–200
(c) 201–500
(d) 501–1,000
(e) 1,001–2,000
(f) 2,001–3,000
(g) over 3,000

What capacity cards do you use? Indicate nearest if no exact number is listed.

(a) 1,000
(b) 2,500
(c) 5,000
(d) 7,500
(e) 10,000

How many card packs do you have? . . . .

Section 7. Punching time

How much time is spent, on average, punching *per item*?

(a) Up to ½ minute
(b) ½–1 minute
(c) 1–2 minutes
(d) 2–5 minutes
(e) 5–10 minutes
(f) 10–15 minutes
(g) Over 15 minutes

Section 8. Thesaurus

Are your indexing terms selected:

(a) Entirely from an externally published thesaurus?
(b) From a published thesaurus supplemented by in-house terms?
(c) From an in-house thesaurus?

If the answer is (a) or (b) which thesaurus is used?

. . . .

(d) How many indexing terms are there in the thesaurus?
Under 100
100–200
200–500
500–1,000
Over 1,000

Section 9. Input to system

How many items did you input during the previous 12 months?

(a) Under 100
(b) 100–500
(c) 500–1,000
(d) 1,000–2,000
(e) 2,000–5,000
(f) Over 5,000

How many items have you accessioned into the system altogether? . . . . . .

Section 10. Staff effort

What is the total number of staff hours spent each week on:

(a) Intellectual aspects, e.g. indexing . . . .
(b) Clerical aspects, e.g. punching, filing, loaning documents . . . . . .

Section 11. Problems

Have you experienced any of the following problems?

(a) Cards dimensionally unstable ☐
(b) Errors in printing on cards ☐
(c) Excessive mechanical failures with equipment ☐
(d) Excessive wear-and-tear damage to cards before fully used ☐
(e) Any other problems . . . .
. . . .
. . . .
. . . .

Section 12. Multiple copies

Do you prepare multiple copies of packs for distribution to other centres? Yes ☐ No ☐

If the answer is Yes, how do you prepare such multiple packs? . . . . . .
. . . .
. . . .
. . . .
. . . .

Section 13. Address for results of project

Name . . . .
Organisation . . . .
Address . . . .
. . . .
. . . .
. . . .

Section 14. Further copies

Please supply a further . . . copies of this questionnaire.

Letter to the Editor

Dear Sir,

THE FOREIGN-LANGUAGE BARRIER

I am sorry if I appeared to dismiss Dr Urquhart's proposal summarily (see July issue, p. 378): attempts at brevity can easily sound like curtness. I was not questioning the desirability of his proposal, but I was disputing, and still dispute, the probability of its making any significant impact on the language problem, or in any way weakening the case for a national translation service. Indeed, it could easily be used as an argument for not doing anything at a national level to solve the language problem, whereas it seems clear to me that national action is desperately needed: how desperately is demonstrated by the recent Sheffield report on *The language barrier*.

Yours faithfully,
MAURICE LINE
University Librarian

University of Bath,
Claverton Down,
Bath BA2 7AY.
30th July 1971

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Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

Items are available in the Aslib Library and may be borrowed unless marked to indicate reference copies.*

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Informatik, vol.18, no.2, 1971, p.34–5.
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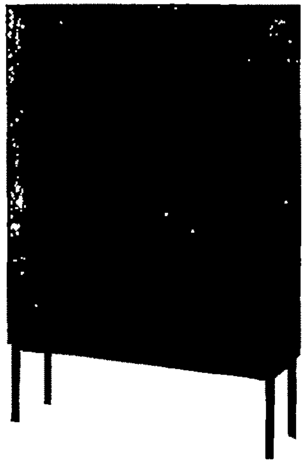

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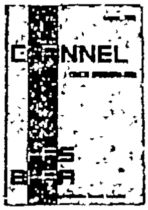

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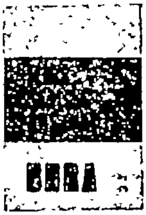

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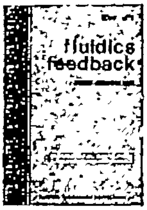

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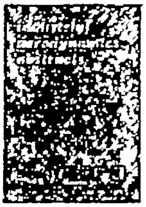

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ASLIB PROCEEDINGS

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Volume 23 **October 1971** **Number 10**

ASLIB CALENDAR 1971

November

MON.1.	Co-ordinate Indexing Group meeting. Aslib. 3.30 p.m.
MON.15.	Audio Visual Group one-day Workshop: 'Sound recording'. Aslib.
TUE.16.	Chemical Group evening meeting: 'Why toxicity testing?', by B. J. Simpson (Shell Research Ltd). Aslib. 5.30 p.m.
	Economic and Business Information Group visit to British Institute of Management, Parker St, WC2. 2.30 p.m.
THU.18.	Aslib one-day Seminar: 'Analysis and design of systems with a consideration of the computer's role'. Connaught Rooms, Great Queen St, WC2.
FRI.19.	Technical Translation Group meeting: 'Quality in the numerate society', by J. T. Craddock. Aslib. 4 p.m. Annual sherry party, 5.30 p.m.
WED.24.	Aslib evening meeting: 'The administration of diffuse collections', by W. Ashworth (Polytechnic of Central London). Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1. 5 for 5.30 p.m.
	Chemical Group visit to Smith Kline & French Laboratories, Welwyn Garden City.

December

WED.1.	Engineering Group evening meeting. Speaker: Mrs Rena Knight (CIRIA). Aslib.
WED.8.	Economic and Business Information Group visit to DTI, Victoria St, SW1.
MON.13.	Social Sciences Group evening meeting: 'The SSRC project', by J. E. Pemberton (Warwick University). Aslib. 5 p.m.
WED.15.	Aslib Christmas Party. Aslib. 5.30 p.m.
FRI.17.	Scottish Branch Christmas Party and meeting. Speaker: Professor W. E. Tyler.

OSTI Grants to Aslib 1972–74

The Government has offered further grants in support of Aslib's research programme and services for the three years 1972–74 inclusive. The current offer shows welcome increases over the grants paid during 1969–71 but, in accordance with Government policy, on condition that the contributions of member organizations are similarly increased. The terms of the offer are now being considered by the Council of Aslib, and the details will be published for the information of members in due course.

The administration of diffuse collections

At an Aslib evening meeting to be held on 24th November at the Royal Institution of Naval Architects, Mr Wilfred Ashworth, Chief Librarian of the Polytechnic of Central London, will speak on 'The administration of diffuse collections'.

Many library systems have to operate a number of branches or service points at geographically-separated places. The implications of this are considered firstly from the management aspect and then from the points of view of costs, staffing, duplication of stock, general efficiency, and, especially, the quality of service given to users. As little information is available on the problem, in spite of its widespread occurrence, suggestions are made for further study. It appears likely that in future, as a result of industrial mergers, grouping of academic libraries and local government reorganization, the tendency will be towards larger units with aggravation of the situation.

Chairman of the meeting will be Mr G. A. Barnes, Chief Librarian of the Procurement Executive of the Ministry of Defence. The meeting begins at 5.30 p.m. (tea 5 p.m.).

Engineering Group Conference

The Aslib Engineering Group's Conference will be held next year from 25th to 27th February at the Industrial Staff Training College, Dunchurch, Rugby. The subject of the conference is one which is very much to the fore these days: 'Costing information and library services'. Speakers will be C. D. Overton, B. C. Vickery, J. Cook, R. Sturt, Dr A. Kabi and Professor W. Saunders.

Examples of costing techniques, teaching costing to future librarians, effects of costing on libraries, and the use of external information services, will form the first day of the conference. The second day will consist of a teach-in based on the previous day's papers, led by Professor Saunders of Sheffield University.

The Group's AGM will be held during the conference and elections carried out for the Committee for the year beginning 1st April 1971. Nominations, with names of proposer and seconder, should be sent to The Group's Chairman, Mr B. R. Styles, The Library, Department of the Environment (Housing and Construction), Lambeth Bridge House, London SE1.

Considering the topicality of the conference theme, it is hoped that there will be a good attendance. The Industrial Staff Training College offers excellent facilities and the speakers promise instructive and interesting papers.

NATO Advanced Study Institute: On-line mechanized information storage and retrieval systems

The Scientific Affairs Division of the North Atlantic Treaty Organization has made a grant in support of an Advanced Study Institute to be held in Lyngby at the Technical University of Denmark from 24th July to 4th August 1972. The subject will be on-line mechanized information storage and retrieval systems. Apart from the lecturers, there will be a maximum of fifty-five students; travel grants and fellowships may be made available to those attending.

The Director of the Institute will be Cyril Cleverdon, Cranfield Institute of Technology, Cranfield, Bedford, from whom further particulars can be obtained.

'UDC and other indexing languages': FID Symposium

Over 120 delegates attended the Symposium on 'UDC and other indexing languages' organized by the FID and held in Herceg Novi, Yugoslavia, from 28th June to 1st July. Eighteen papers were presented in the five sessions, which covered: Classification improvements; UDC versus other indexing languages; Link and switch role; Descriptor and indexing languages; and UDC/thesaurus concordance and combination. In the final session a six-member panel discussed their views on the Symposium as a whole; this was followed by a general discussion and a final summing-up by the chairman, Mr G. A. Lloyd.

It is hoped that the Symposium proceedings will be published by the end of this year. The publishers will be the Symposium organizers: Jugoslovenski Centar za Tehničku i Naučnu Documentaciju (Slobodana Penezicá-Krcuna ul. br. 29–31, P.O. Box 724, Belgrade).

ANBAR Management Services: 11th volume

ANBAR Publications have announced that the 11th volume of *Management Services Abstracts* will in future consist of four abstracting journals: *Top Management Abstracts*; *Personnel+Training Abstracts*; *Marketing and Distribution Abstracts*; and *Accounting+Data Processing Abstracts*. Three of these journals are new; the fourth, *Accounting+Data Processing Abstracts*, is already established, being published in association with the Institute of Chartered Accountants in England and Wales.

Each abstracting journal will have its own index, but overall unity will be maintained by the publication of one annual index covering all four journals. *Management Services Bibliography* will also continue to be issued. Tear sheet library and Telex references retrieval facilities will also continue to operate.

Further details are available from Anbar Publications, P.O. Box 23, Wembley HA9 8DJ.

Conference on Microfilm

A two-day conference/exhibition called 'Microfilm methods up-dated' will be held at the Bloomsbury Centre Hotel, London WC1 on 4th/5th November. The following subjects will be discussed: Micropublishing; Microfacsimile; Microfilm storage and retrieval; Computer INPUT microfilm; Computer originated microfilm applications; and COM Graphics. Accompanying the conference will be an exhibition of equipment which will include both new products and new versions of existing items in this field. The conference fee is £20. Further details are available from Training and Business Ltd, P.O. Box 30, Harrow HA2 0NP.

Pumps and other fluids machinery Abstracts

The Fluids Engineering Information Centre of the British Hydromechanics Research Association is extending its services to include a bi-monthly publication, *Pumps and other fluids machinery Abstracts.*

The aim of this publication is to keep all users and manufacturers of pumps and similar fluids handling equipment informed, with the minimum of delay, of the latest advances in the design, development, manufacture, operation and performance of industrial pumps and similar fluids handling machines.

Over 450 scientific and technical periodicals, in addition to research reports, conference papers, books, and British Patent Specifications are scanned in the compilation of *Pumps Abstracts.*

Further details and a specimen copy may be obtained from: Publications Sales, BHRA Fluid Engineering, Cranfield, Bedford.

BSI: new standards

Standard book numbering

In 1967 the Standard Book Numbering Agency introduced a standard system for book identification numbers. Since then the scheme has been adopted internationally and BS 4762 *Book numbering*, recently published by the BSI, is based on a draft prepared by the International Organization for Standardization (ISO). The new standard describes how an international standard book number is constructed, and in an appendix to the standard there is an account of what the functions of an international standard book numbering agency will be.

Presentation of translations

Also based on a proposal by the ISO is BS 4755 *Presentation of translations.* This standard lists essential information which should be given on the title leaves about the original as well as the translation, and optional information which may be useful in certain cases. It makes recommendations for this arrangement of headings, tables and illustrations and for ways of dealing with particular features of the original text. The standard is not designed to deal with matters of translation technique, though some aspects of presentation depend in part upon this—for example the occurrence of translators' notes.

Bibliographic details on printed music

Of interest to music librarians and bibliographers will be BS 4754 *Presentation of bibliographical information in printed music,* which gives guidance to editors and publishers on the kind of bibliographical and related information that should be provided in printed music. The standard defines terms for describing the type of publication, lists essential information which should be given in all printed music and additional information which should be given where possible, and makes recommendations for the presentation of such information.

All three standards are available from the BSI Sales Branch, 101 Pentonville Road, London N1 9ND.

People and Places

MR J. R. DAVIES has recently taken up the post of Advisory Industry Representative/Information Retrieval at the IBM Scientific and Cross Industry Centre, Weesperplein 4, PO Box 9999, Amsterdam. Mr Davies will be well known to many members as former Manager of the Communications Department at IBM's UK laboratories at Hursley Park, and through his assistance in a number of Aslib activities in recent years. In a letter to the Director of Aslib, Mr Davies extends his thanks to the many members of Aslib with whom he has come into contact for their friendliness and co-operation during this time.

Professor J. D. Bernal, F.R.S.

Members will have heard with deep regret of the death, at the age of 70, of Professor John Desmond Bernal, F.R.S., a good friend of Aslib for over twenty years and the Government nominee on the Aslib Council in the 1950s, and again in the late 1960s. Bernal, who was appointed Professor of Physics at Birkbeck College and elected a Fellow of the Royal Society both in 1937, took an active part in the Royal Society's conference on scientific information in 1948 and was, until restricted by ill-health in the last three or four years of his life, one of the small number of eminent scientists in the UK to involve themselves whole-heartedly in the problems of efficient scientific communication systems.

BRIEF REVIEWS

ABOUT PATENTS: patents as a source of technical information. Prepared by the Patent Office of the Department of Trade and Industry and the Central Office of Information. London: Patent Office, 1971. 21 pp. Free.

This introduction to the work of the Patent Office states that in its specifications describing patented inventions, the Patent Office has the most comprehensive indexed bulk source of technical information in the country and points out that this information is readily available to the public. This booklet gives a brief description of a patent and then continues to describe how one searches the patent literature, to find out if your 'invention' has been published before. A detailed example of a subject search is described. The patent literature can also be searched by using the name index to trace what patents have been granted to a particular firm or individual. There are three appendixes: one lists divisions and subjects covered by the classification scheme used by the Patent Office; the second gives a full list of Patent Office publications; and the final appendix lists libraries in the United Kingdom where patent publications can be consulted. This booklet gives a very useful introduction to patents particularly for those people with no experience of patent literature.

AMERICAN SOCIETY FOR INFORMATION SCIENCE. Key papers in information science. Edited by Arthur W. Elias. Washington, DC: the Society, 1971. 223 pp. $6.00. (ISBN 0 87715 101 6)

This publication is intended to provide students of information science with the basic readings in their subject, mainly from journals, which are normally held in insufficient numbers in libraries for a whole class to borrow copies simultaneously. Documents were selected to be readily comprehensible to novices, but also to retain their value for a number of years.

The nineteen articles, which vary in length from three to twenty pages, are grouped into four categories: background and philosophy; information needs and systems; organization and dissemination of information; other areas of interest (e.g. automation, analysis of information systems, copyright as affected by information retrieval). Most articles were first published in the second half of the 1960s and many standard writers—Borko, Shera, Weinberg, Luhn, Rees and de Gennaro—are represented.

Reproduction has been by photographic means, so that the original, varied formats of the individual papers are retained, as are, to facilitate reference, the original page numbers. However, the present work is also paginated separately.

FLETCHER, JOHN, *ed.* The use of economics literature. London: Butterworths, 1971. 310 pp. £4.50. (ISBN 0 408 70171 4)

The purpose of this book is to provide a guide to three things: first, what material there is on the various branches of economics, what is important and valuable, and what level it best serves; secondly, what tools are available to assist the researcher in making a more extensive and intensive survey of the literature of his specialized field; and thirdly, where the material can be found. The chapters are arranged within this overall framework.

The editor states that this is the first joint attempt by librarians and economists to view the literature of economics and provide a guide to it. As might be foreseen, there is a resulting overlap and disorganization of material, in coverage and presentation, particularly noticeable in insufficient coverage in the libraries section. For example, one sentence is devoted to the Statistics and Market Intelligence Library of the Department of Trade and Industry, and there is no mention of the National Central Library in the interlibrary loans section.

The overlap in coverage means that a reader cannot be sure that he has completely covered the topic he is interested in simply by reading a whole chapter or section of a chapter. This might be remedied by a thorough index, but unfortunately this is not provided here. One instance of this is the entry for Unesco. From the index the reader is referred only to the section within the chapter on International Organizations' Publications, which makes no reference to the information recorded in the second chapter ('Libraries and Making a Literature Search') that Leeds City Libraries are a depository for Unesco documents.

As is frequently the case with guides to the literature, since the compilation of the book new editions of reference works have become available and new publications have appeared. This book can therefore take its place with others, to be used in conjunction with them, as a by no means perfect but nevertheless useful source of information on statistics sources, bibliographical tools, periodicals, economics libraries, and economics books.

HARVEY, JOAN M. Sources of statistics. 2nd edition (revised and enlarged). London: Bingley, 1971. 126 pp. £1.75. (ISBN 0 85157 115 8)

This second revised and enlarged edition of the book first published in 1969 is a welcome addition to the existing guides to the literature. The content has been updated and new material has been added, with the inclusion of three more chapters.

The subject has been treated under fourteen headings in this edition: general, population and health, social, education, labour, production, trade, finance, prices, transport, tourism, justice, public administration, and advertising. There is also a new index to initials used in the text, and a much expanded subject, publication, and organization index.

The book should be of great value to librarians and information workers especially, but in fact will be useful to anyone concerned with tracing statistical information.

INTERNATIONAL DIRECTORY OF COMPUTER AND INFORMATION SYSTEM SERVICES 1971. 2nd edition. London: Europa, for the Intergovernmental Bureau for Informatics, Rome, 1971. 475 pp. £5.00. (SBN 900362 31 6)

The first edition of this directory appeared in 1969. It gives information about the computer services provided by commercial concerns, service bureaux, consultants, and educational and research establishments throughout the world. The entries are arranged by country and divided into categories such as those above. The categories have been reorganized since the first edition, the sections for brokers and research and development concerns have been dropped and a new one for educational and training institutions has been introduced. Service bureaux are no longer divided by speciality.

The entries usually include the name, address and telephone number of the organization, the names of senior officers, type of computer installation, coding languages, services available, fields of operation etc. There is an index arranged by the name of the organization and to computer installations. Many new entries are listed in this edition and several are no longer included.

LIST 1971. Library and information science today. Edited by P. Wasserman. New York: Science Associates/International, 1971. 414 pp. $25.

This international register aims at providing 'a formal mechanism for gathering and broadcasting timely information on notable work in progress in librarianship and information science'. Based on answers to questionnaires, distributed all over the world, it describes more than 800 efforts in 35 countries in progress up to September 1970. It is thus the first in a series which will be revised annually.

Each entry gives the principal investigator, title of project, name and address of institution where work is being done, the funding source, the time scale, and a brief description of objectives. The arrangement of entries is by subject under the broad headings: operations, materials, users, librarians/information scientists and organizations, with more detailed breakdown within each heading. A very useful feature is the provision of six indexes by: principal investigators, organizations, geographical location, funding source, title of project, and subject and keyword.

NATIONAL MICROFILM ASSOCIATION. 'Infographics': proceedings of the nineteenth annual meeting and convention, San Francisco, 1970. Edited by Vernon D. Tate. Silver Spring (Md): the Association, 1970. 317 pp.

This is a compendium of the various addresses, invited papers and seminar contributions presented to the National Microfilm Association's 1970 meeting.

The most substantial offerings are those from the five invited speakers on: application of different methods of image evaluation in the microfilm industry; cable television and microforms; system considerations in microfilm reader designs; microforms and the research library; market forecast of the micrographics industry.

The ten seminars each take as their theme the use of microforms in one sphere of activity: business, insurance, medicine, libraries, computer-aided instruction, engineering drawing offices, government operations (e.g. the Bureau of the Census, police departments), science, banking, micropublishing. Papers are very brief, averaging about three or four pages of somewhat large type.

The book concludes with a useful list of exhibitors at the convention, arranged by product exhibited.

ASLIB SYMPOSIUM ON PROBLEMS OF USING EXTERNAL INFORMATION SERVICES

June 1971

CHAIRMAN'S INTRODUCTION

F. W. MATTHEWS

Head, Central Technical Information Unit, ICI Ltd

THE LAST TWO Aslib meetings which I have attended I found perhaps a little disturbing. The one before the last was the Annual Conference of the Chemical Group and, although I was not there for all of it, I did listen to the discussion. One speaker started out essentially bemoaning that librarianship was not what it used to be; it had gone to the dogs as far as he was concerned, and part of the blame—at least a large part of the blame—was that infernal machine, the computer. We can be thankful the discussion did not end on that note.

Some of us had the privilege recently of listening to the Fifth Aslib Annual Lecture, an excellent presentation by Dr Herbert Coblans—excellent and provocative. I have a special definition of 'provocative' which says 'one which was talked about for three days after the lecture'. That, I think, is all that a speaker, and more than most speakers, can hope for—that what he says is discussed for three days after it was over.

But it was provocative for me in a special sense in that the computer was put up as a false god. A false god is one that if you worship it you are destined for purgatory or outer darkness, or wherever. If that is true, I am on the way to hell fast, because I'll stand on my belief that the computer is the librarian's mechanical servant, second to no-other. I put it in the same field almost as the telephone, and it is now very obvious that if automation had not taken over, the services of the telephone would be very severely restricted, and their growth would have been very different from what they have turned out to be. Sometimes, when I have spent half an hour trying to call British Rail at Paddington station, I wonder when Britain found out about that mechanical aid. But that is the general impression perhaps of a Canadian, and Canadians use the telephone per capita more than any country in the world. I don't know what else that makes us, but it makes us dependent on our telephones in a very real sense.

Now, in a similar way, I believe that the growth of information services and librarianship will be severely restricted unless automation takes over in a very large way. That is the thesis on which I stand and I hope it is quite different from one that is suggesting that the computer is a false god. I may be overboard on this, but speaking along this line I suspect I am preaching to the converted, because in spite of the title, anyone looking over the programme today will realize that the subject of the computer is bound to occur frequently in what will be said today. We are essentially talking about machine-readable data bases and how we can exploit them: that would be the sub-title I would put on the conference proceedings.

If I were to set up a false god, for me at least it would be perhaps the cult of the new and the interesting—something that we chase just because it is new. England is rather better than America, I would say, at being critical of the new ideas that come forward in the automation of information handling. The excellent criticism that has come from England in this field has undoubtedly been a great contribution to the development of information and computer handling along sound lines. Sometimes I feel, of course, that England gets too good at this and there we have a problem—if that were true. But, after all, *Chemical Titles*—which was in at the start of this sort of thing—is now about seven years old. During the past six or seven years there have been major changes in the way things are being handled. We are beginning to see some evidence of maturity developing—for instance, uniform format of presentation is beginning to be discussed, if not carried out in practice yet. SDI has come along and is probably the most successful of the exploitations of machine-readable data bases—I believe much will be said about that. Retrospective search is not in a happy state; the predictions of how easy it was going to be in this area have not really materialized, and I think any discussion we can have on that will be very helpful, as we can see glimmers of light in successful economic retrospective search.

Relevance and recall, which is, of course, the yardstick by which we judge these things, is bound to come up. There are problems here; nevertheless, the concept which Cleverdon has used so successfully in evaluation will still be the best yardstick we have of how effective these systems are. Cost is bound to come up, because it is a very controversial part of it. One subject that I don't know how much will be talked about today is the role of government. There is a wide spectrum for the role of government in this field; from the USSR at one extreme, where the government does a lot, to the UK which, out of the larger countries, is probably at the other extreme. In between we have the United States, France, and some of the smaller countries—Scandinavia, Holland, Canada and South Africa—which find it easier to find their reasonable role for government. I suspect that it is because they are smaller, newer, and do not have the entrenched positions of established traditions in this field that seem to make new organization more difficult.

For the first session we have three speakers who will present some of the background, and they are Mr Dammers, Mr Robinson and Dr Leggate. For the second session we will have four papers from a panel of speakers who are essentially concerned with either the production of machinery for data bases or the services that can be rendered from them. Following that panel, there will be a summation by Mr Vickery of the main problems discussed.

SDI: SOME ECONOMIC AND ORGANIZATIONAL ASPECTS

H. F. DAMMERS

Shell Research Limited, Sittingbourne

Paper presented at a one-day symposium on Problems of Using External Information Services (Session 1: The view of the user), Royal Aeronautical Society, 16th June 1971

IN THE CONTEXT of the present symposium it would seem appropriate that I should deal specifically with the economic aspects of Selective Dissemination of Information (SDI) operation and use. In my opinion the technical feasibility and merits of SDI have been adequately demonstrated; the main barriers hindering general use, however, tend to be of an economic nature.

At Shell Research in Sittingbourne we have been operating, since 1967, an SDI service for the research staff and it has grown rapidly, particularly since we started to use the *CA Condensates* tapes early in 1969. In addition to these tapes we are currently using the *BA Previews* tapes, AGDOC tapes (prepared by ourselves using punched card input received from Derwent) and, on an experimental basis, Toxitapes, produced by BIOSIS, Philadelphia. All these tapes are searched locally, involving the running of around five hundred profiles weekly.

The service has now reached a level of general acceptance at Sittingbourne that makes it appropriate to reflect on the merits and perhaps some of the problems involved in such a sizeable system.

Considering that SDI systems really go back only to about the mid-sixties, one might claim that their development and acceptance has been quite a rapid one, although it has not always appeared so to those who were concerned with the operational and economic difficulties involved. There are a number of factors that have helped the development of SDI. First and foremost, there is the fact that computer facilities have become available at a greatly increased rate during the past decade. Secondly, the application of computers in computer-aided typesetting, thus generating almost automatically a machine-readable data base; and thirdly, of course, the expansion of the world literature which makes it more difficult and expensive to keep aware of relevant literature; and last—but not least—the increasing cost of labour and labour intensive services such as the conventional library/information service. A whole variety of machine-readable data bases have become available during the past six or seven years and their number is still growing. Accordingly, one finds that a number of organizations and information centres have started to use these data bases to provide a routine SDI service.

Despite this growth, the total use, compared with the potential use, is still relatively small; I would guess that perhaps not more than 2 per cent of the professionals in science and technology in the Western world use computer-operated SDI services. However, on the other hand, I am quite confident that the rate of growth is likely to remain quite substantial.

To the user, one of the principal benefits of the SDI system should be a more personalized service—that at least is the aim of the system as operated at Sittingbourne. Each profile is specifically run for one particular user. It should provide him not only with a wider coverage of literature sources, but also with a saving in his own labour effort. In fact we operate on the assumption that the use of SDI should give rise to a mode of operation, as follows: first, the user, in a research establishment such as ours, is likely to read and scan a relatively small number of general science journals. In addition, he will need to read a limited number of specific subject journals. With regard to relevant literature from other sources he is advised via the SDI system. He can obtain copies of papers of interest using the SDI notifications; in addition he can maintain a personal file of relevant literature on tape in machine-readable form using the SDI output. The latter facility should help him to eliminate the need for maintaining a private index.

In order to enable us to assess the economic merit of operating an SDI system, one would like to know, of course, how much time the average user spends on current awareness and related private indexing activities. Such information as is available appears to suggest that, in a research establishment like ours, the average time absorbed by the user in this type of activity might be of the order of one hour per week. That ranges very widely from probably hardly more than a quarter of an hour a week to more than four to five hours. Let us assume that the saving per user would amount to an average of £150 per year. Although it would appear that an SDI service provided to a user at that level of cost might just about break even, in fact one will have to provide it at a much lower cost in order to create an adequate incentive to user and management alike. Cost is probably the dominant factor in gaining wide acceptance of the SDI service.

With regard to the library/information service, the use of the SDI system will obviously affect the operation to quite an extent. Perhaps the most significant effect is that the SDI system allows the provision of a wider range of services and more economical use of labour resources; this may well apply whether one uses SDI to replace a manual system or as input to a manually operated system.

The operation of SDI and with it the need to acquire and monitor the use of machine-readable data bases, is likely to lead to a greater interaction with data base producers, and this in turn is likely to benefit the operation and status of the library/information service. One might perhaps also justify SDI on the grounds that it could help to restrain expenditure on journal subscriptions. One might perhaps restrict subscription to a nucleus of general journals and those major journals which are highly relevant to the users' subject interests. In view of the very substantial increase in the cost of literature, this could lead to a not insignificant saving in literature purchase. However, such a gain may well be offset by the increased expenditure on borrowing. Extensive use of the SDI system does lead to an increased requirement to borrow literature, and as the cost of borrowing literature is not negligible—probably between 50p and £1 per paper—one may generate a very substantial cost element on that account.

Overall, though, the availability of SDI would appear to be beneficial to the operation of a library/information service. It will widen the range of its capabilities and provide a greater interaction with both the sources and the users of the information. However, until we establish a satisfactory means of dealing with loan procedures, it will also mean that routine clerical operations are perhaps not going to decrease all that significantly. There is also, of course, the problem of the selection of suitable data bases. In our case we are fortunate that most of our literature requirements—perhaps 70 per cent—are covered by *Chemical Abstracts* and *CA Condensates* which therefore form a good data base for current awareness. The use, in addition, of the *BA Previews* tapes, covers our requirements for well over 90 per cent and this makes it economic to run our service, based on these tapes, in house. However, where such a situation does not apply, one obviously has to make use of outside services, and this would in particular hold where one has to search rather large data bases relatively infrequently, as is the case in retrospective searches. As Dr Matthews has already pointed out, retrospective search by computer remains a serious problem area.

With regard to the organization served, there are a number of reasons why the implementation of an SDI system could be—and should be—of value.

In the first place it offers a means of increasing productivity from existing labour-resources. In view of the high proportion of time that tends to be absorbed in information handling, communication in the widest sense (as shown by Halbert & Ackoff in the late fifties) and the current inflation of wages and salaries, there must be a strong incentive on the part of management to adopt procedures which promise to counteract the increase in labour costs.

Use of SDI does provide a more effective means of exercising meaningful control on the steadily increasing costs in literature purchase and labour effort involved in maintaining adequate coverage and awareness of the current literature.

As I indicated earlier, this may not, in the short term, lead to notable savings in terms of actual expenditure; it will, however, provide a more effective framework for planning the allocation of resources for the provision of literature information.

The availability of SDI can form an important building stone in the development of a more comprehensive and integrated information system, involving the storage and retrieval of internally generated information, use of computer typesetting and so on.

The aspect already hinted at with respect to the library/information service would appear to apply *a fortiori* with respect to the user organization as a whole; the facilities and expertise generated via the use of the SDI system should aid the development towards a more effective interaction between, and co-operation with, extra-mural sources and the recipients of information and data. In the longer term, this should lead to a more economical use of all the information relevant to the operation of the organization concerned. However, I should emphasize that one may have to cope with side-effects, such as the generation of increased loans, which may cause additional expenditure not necessarily offset by savings elsewhere.

Hence there are a fair number of factors that have to be considered when assessing the merits of an SDI operation. I would like to look at some of them in a little greater detail. I have already indicated that the user who has access to a good library information service—for instance the research worker—may perhaps be spending something like £150—say 2 to 2½ per cent of his time—on current awareness activities. The fact that a current awareness activity may be worth £150 a year to a user, in terms of his own time, does not of course mean that he will therefore also be prepared to spend £150 a year on an alternative. SDI use is likely to be strongly cost-dependent, and there is some evidence to suggest that the price and demand relation with an SDI service may well be rather analogous to that, say, for motor cars, and it is quite obvious that the sales you may expect for a Rolls Royce or for a popular car will vary very widely.

I would like to suggest that something like the following cost–demand relation might perhaps apply:

Profile cost (*£ approx.*)	*Demand* (*% of all potential users*)
150	2
100	10
50	40–50

TABLE 1

In our own case we run the system at a cost well below the £50 profile and appear to have reached perhaps 70 to 80 per cent of the potential use in our research establishment; this is perhaps as high a proportion as one can ever hope to get.

In the past the emphasis has been on quality of performance, and it may well be that the main effort now should be devoted to lowering the cost, at least if one hopes to achieve widespread use of an SDI system. It is only through widespread use that the SDI can make a significant impact on the way informations systems in general are likely to develop.

The need to move towards lower costs on SDI is aided by the fact that computer processing costs are tending to decline, whereas labour costs and the cost of printing material are steadily rising. Hence computer-operated procedures and systems should cost-wise compare more and more favourably with conventional systems. Already the computer costs involved in running one search term every week against a large data base, such as *CA Condensates,* may be as little as the equivalent of half a man-hour per year.

As an illustration of the trend towards lower computer costs relative to labour, I give here (Table 2) some assessments based on our own computer-work, covering numeric as well as non-numeric processing. The labour-equivalent (man-hours) of a computer-run has been obtained in this case by dividing the cost of the computer-run by the current cost of a research man-hour (including overheads), the computer-runs being roughly equivalent in terms of processing done and output produced. Current developments in computer technology and labour-cost would seem to ensure that the cost per run expressed in man-hour equivalents will have declined to about 0.5 by 1975, i.e. the decline appears to be of the order of 20 to 30 per cent per year, at least in our case. It is this decline in computer cost relative to labour that is perhaps one of the main driving forces towards increased computer use.

I indicated earlier that one can expect an increase in demand with declining costs of the SDI operations; hence the decline of computer processing should generate a greater demand for SDI systems, the increase thus generated might well be of the order of 30 to 50 per cent per year. Obviously such a development is not likely to occur in those cases where SDI cost to the user is rather insensitive to changes in processing costs; that is, when it is rather labour-intensive or burdened with very heavy fixed costs. In our own case, therefore, we have tried very hard to avoid such a situation; at present around 60 per cent of the cost of an SDI profile run at Sittingbourne is actual computer-processing cost:

Year	*Cost per run (expressed in man-hours approx.)*
1967–68	2–3
1970	1
1972 (est.)	0.7–0.8

TABLE 2

Computer use is as a rule justified on the grounds of its ability either to replace existing human effort or to perform a task otherwise not feasible; I am convinced that SDI and its use of machine-readable data bases can be justified on both grounds. It saves human effort and it can also stimulate the handling of information in an integrated manner otherwise not feasible.

Finally, in order to put SDI in perspective as far as cost is concerned, and also as a stimulus to our subsequent discussion, I give here some estimates of the costs of various information operations (Table 3). It should be emphasized that these are only rough estimates not referring to any specific situation although obviously my experience in a research environment has influenced the selection.

The cost assessment associated with user time spent on information use/handling in the widest sense is based on the assumption that a professional may be spending as much as 20 per cent of his time on such activities.

The cost of SDI varies widely according to the various services in operation, and this is reflected in the estimate given. Our own experience would appear to indicate that the cost of a fully developed SDI service might perhaps amount to around one-third of that of the conventional library service. It reflects the status achieved with a system developed successfully over a period of three to four years. This development has certainly been aided by some favourable conditions, such as the fact that the system could be readily implemented using computer facilities available on the site, and also the fact that the organization is one

	Per user, per year (£ approx.)
1 (a) user time spent on information handling in the widest sense	1,000
(b) user effort on current awareness relating to literature information	100–150
(c) user effort on maintaining private indexing system	50–150
2 Effort dedicated by the user organization (as a whole) to information handling (incl. library, reproduction, reporting, typing etc.)	250–500
3 Library	
(a) literature purchase	50–75
(b) annual increase in 3(a) needed to maintain coverage	10–25
(c) loan activities	5–10
(d) staff costs	25–25
(e) total	75–125
4 SDI	20–75
(a) extra loans generated	2–15
(b) potential annual reduction in running costs	3–5

TABLE 3

accustomed to growth and change and modest enough in size to allow a very good interaction with the user. Perhaps the keystone in any information system development is the close *rapport* with the user; in addition, one needs a management that, whilst questioning the economic merits, is prepared to encourage new approaches.

PROBLEMS OF USING EXTERNAL SERVICES FOR RETROSPECTIVE SEARCH

F. ROBINSON

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Paper presented at a one-day symposium on Problems of Using External Information Services (Session 1: The view of the user), Royal Aeronautical Society, 16th June 1971

THIS PAPER is based on a study made of the possible use of *CA Condensates* for retrospective search purposes in ICI. Such a study is often a good way of defining what the problems are.

Most organizations have to make some use of external sources for their information; even if there is delay before items get into them, it is cheaper to wait than to abstract the world's literature. There is little need to discuss 'doing it yourself', i.e. providing your information from complete coverage of the literature; one has to go to the external services.

These services are traditionally printed, but nowadays are often issued on magnetic tape. Since this symposium is on the wider definition of external services and not just tape based services, the problems of using the printed services should be discussed.

The use of printed sources for search purposes means using the index, finding the information, then organizing the answers, writing, typing, copying, or in some way notifying the enquirer of the information.

Few people are yet making use of microfilm for this sort of service.

In using printed secondary sources for search purposes one is almost entirely dependent on the quality of the index. With a good index, retrospective searches can be fairly economical. If the index is not good, the size of the data base, the range of the secondary source, may well make it almost impossible to find information at all. In such circumstances, it is necessary to skim and scan hoping to find something relevant, which is extremely difficult. Good indexing really means consistent indexing. The worst indexing is probably not the indexing which is always pointing to the wrong place, but which points to different wrong places.

The National Reference Library of Science and Invention includes in its list of abstract journals (and this list is not exhaustive) some six hundred different sources, ranging from *Applied Mechanical Review* to *Chemical Abstracts*; from *Field Crop Abstracts* to *ANBAR*. This shows the wide range of available services and it is clear that most companies or organizations are concerned with several of them. This raises the question of disparity. It would be valuable if all had good consistent indexes and all were based on the same indexing principles. The problems of teaching new staff the differences between A, and its indexes, and B, with its indexes, are well known. Until staff know the differences between the secondary sources they will have difficulty in getting answers. This question of disparity of approach will be discussed again later.

With this range of secondary sources containing relevant information, good exploitation may be achieved by using computers; otherwise, the intellectual effort and the time involved in sorting the data may be overwhelming.

Most of the external sources are, of course, not available in computer form. Those which are available normally use magnetic tape for distribution. These tape services are mainly designed for SDI, particularly the important ones which tend to have large output. In the booklet *Survey of Scientific–Technical Tape Services,* compiled by K. D. Carroll, and issued by the American Institute of Physics, forty-eight tape services are described. A brief analysis of these services shows that twenty-four cover up to 20,000 items a year; seven services offer 20,000–50,000 items a year; and five offer between 50,000 and 100,000 items a year. This latter range includes Compendex, MARC and IFI. There are ten services outputting more than 100,000 items each year. These are:

Agridex
Biological Abstracts
CA Condensates
Chemical Titles
Derwent (all services)
Pandex
Inspec
ISI
PREDICASTS (Corporations Index)
COMPUSTAT

There is a predominance of services in the chemical/scientific field.

It is unlikely that any one organization is interested in all the services, but many are interested in several. ICI would probably be interested in twenty to thirty. Many companies would like to use, say, ten different data base services. Obviously, if the information is available on tape it is sensible to use it for retrospective work as well as current awareness. But if there are ten different services there may be ten different standards of presentation. This raises again the question of disparity in the available services. For many years printed indexes and secondary sources have been produced with entirely different rules, even extending to the methods of describing the same journal. Standardization is the answer but this did not receive much attention until computers came to be used, when the differences were seen to be time-wasting, expensive and unnecessary. One of the important things being done by ASIDIC in North America and EUSIDIC in Europe is to try to get standards in data distributions, to avoid duplication of software and achieve economic processing. This is clearly important for any organization using more than one data base.

Even if all the services were in a standard format there would still be technical problems in using the large data bases for retrospective search. In this context, technical can be equated with economic. The technical problems in handling these big data bases are generally cost problems, and some of the difficulties vanish if there is unlimited computer capacity.

The first problem, which is not 'technical' in the computer sense, concerns depth of indexing. A record containing only title and author may be good for

SDI, where the information of interest will usually be identifiable from these fields. For retrospective searching more discrimination is needed; possibly not a great deal more, but each additional indexing point is useful. External sources giving title and author only are not likely to be very useful for retrospective search.

The second problem is that of size. *Chemical Abstracts* cover about 6,000 items a week; the estimates done in ICI were based on 300,000 items a year, which was actually 25,000 higher than the 1970 total. The rate of growth is such that the output will soon reach the estimate. In a year fifty-two tapes, each with approximately 6,000 items, are issued. To search these serially—that is going through each tape item by item, looking for specific terms or combinations of terms—means searching 300,000 items, which will be expensive. Because of the delay in issue of *CA* volume subject indexes, a full retrospective search of *CA* can involve a check of two years in this way. Serial search is therefore impossible unless there are many searches, and, if this is so, inverting the file may be justified.

This raises the third problem, which is that the terms used are not necessarily controlled. If the choice of terms is uncontrolled, either in whole or in part (that is if the title is a major indexing point), inversion by comparing the terms with a thesaurus is difficult. An analysis of *CA Condensates* shows that 61,000 different words are used in thirteen weekly issues, which makes inversion difficult.

In any search system it is important that the searchers have knowledge of the terms used in the file. Grouping words in a meaningful way is time-consuming. If there are 61,000 terms in thirteen weeks, and, say, 20,000 additional terms in the next quarter, there is a basic problem of identifying the terms.

Also, it is useful to have knowledge of how often the terms are used in the data base—the flood of terms makes this, too, extremely difficult.

In handling a data base on computer for retrospective search, these problems of size and number of terms are difficult, but not insoluble. Before the ICI study was completed last year, we had devised a system that could have handled *CA Condensates* in a practicable economic form, given a reasonable level of use. Systems for retrospective search that are practical in operation can be developed, but they are difficult to design, expensive to implement and, even more important, they are expensive to operate.

A discussion of 'Problems of Using External Data Services' is bound to emphasize difficulties. But some solutions are available. The size problem, for instance, could probably be overcome by limiting input on the basis of quality. Present services give quantity, but with no indication that A is better than B, or that C is of little value.

Similarly, there are solutions to the 'number of terms' problem. This could well be helped if authors used better titles—an old cry—or by indexing effort at the input stage.

Organizational problems are at the root of handling large data bases for retrospective search. They arise because designing one's own system or running the tapes in-house is expensive. Better methods of handling the tapes are needed and, if economies of scale are possible, external operation could well be the answer. It is also important that a common data base layout be designed and used, so that organizations can use different data bases without having to redesign their systems for each one.

One final point; in ICI the immediate problem of searching the current issues of *Chemical Abstracts* has been partly answered by the production of a cumulative version of the *Keyword Phrases* (the 'Pink Page' phrases) subject index (with titles) on microfilm. Each issue of this microfilm covers thirteen weeks of *Chemical Abstracts*; each entry contains indexing phrase, abstract number, title, and an indicator for patents. This index will help until an economical computer search of *CA* is available, and indicates a new way of approaching retrospective searching of externally produced data bases.

PROBLEMS OF THE INDIVIDUAL USER

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TO AVOID confusion, I will start by saying that I intend to use the word 'user' in a different context to that in which it has been used by Dr Matthews and other speakers. Previous speakers have discussed problems of organizations such as ICI, Shell and UKCIS who are interested in operating magnetic tape services. They have therefore considered the user as the organization operating the magnetic tape service. However, the users whom I will be discussing are the individual research scientists for whom a profile is written, who receives a list of titles or abstracts, and who in some cases goes to the actual documents and possibly extracts useful information from those documents. I have some doubts, however, whether the discussion of the two types of user in the same meeting is a reasonable combination as my own comments will obviously be from a rather different point of view to that of previous speakers.

The subject I most dislike talking about is the user. My view of damnation is talking for ever about users and what they want. Unlike the retrieval systems and computer systems, users are human and therefore difficult to classify. Unfortunately, one can say almost anything and it will be true of *some* users. Even worse, any generalization which can be made will be untrue of at least *some* users. The second reason for disliking the topic under consideration is that I cannot honestly represent the user's view. Once I was a user, now I am part of an information system and therefore presenting a particular system's view of the user. It is my view of the user and, not surprisingly, with increasing age and decreasing wisdom, I am becoming increasingly averse to allowing the user to interfere with the entertainment one gains by playing with the system. The only thing I could do on the user's behalf, which would not be very constructive, would be to be rude to the service suppliers, who are present to answer back, whereas the users are not. However, I do not intend to do so except by accident.

I would first like to establish which users I am talking about and in the context of what information services. The Experimental Information Unit at Oxford was set up with two primary objectives in mind. Firstly, it was service oriented: we wished to look at the characteristics, problems and the performance of individual magnetic tape data bases. To some extent, therefore, we are users in the other sense of the word. Secondly, we wished to introduce these services to a groups of users who had very little experience of mechanized services. Our initial investigations concerned services which were already available in the United Kingdom—*Chemical Titles*; *Chemical Biological Activities* services from UKCIS; ASCA from ISI, Philadelphia; and the manual SDI service by Scientific

Documentation Centre, Dunfermline. More recently, we have studied two new data bases: the *Index Chemicus Registry System* and *BA Previews*.

All these services have two common characteristics:

(i) They are all current awareness services. This emphasis is indicative not of a lack of interest in retrospective searching, but of the unavailability of adequate software.

(ii) Natural language is a feature, usually a major one, of all the services. Thus, *Chemical Titles*, the service with which we have had most experience, is exclusively a natural language data base.

The users with whom we have been primarily concerned are university research workers, although more recently we have written profiles for research workers in industrial or government research departments.

However, I wish to limit my comments to our experiences with the university research worker. Such comments may have some application in an industrial environment, particularly for smaller industrial organizations which do not have the large information departments enjoyed, for example, by ICI or Shell.

Our population of university users is scattered among all the United Kingdom universities. Over a three-year period we have constructed approximately 1,200 profiles for the various services in fifty or more different locations. We attempted to solve the problem of liaison with this geographically scattered population by the employment of itinerant liaison scientists who are both subject and service specialists; the latter, in the sense that they specialized in the provision of mechanized current awareness services. However, they were not 'information generalists' and therefore had no direct responsibility for providing other types of information resources to the university users.

We wished to introduce the university user population to services with which they had very little previous experience and to educate them as to the characteristics and methods of usage of the services. It was hoped that users would develop a critical understanding of the nature of the services and would therefore be in a position to form a reasoned judgement as to whether or not these mechanized services were a worthwhile addition to, or a worthwhile replacement for, their existing manual methods of searching the literature.

One characteristic of the university research worker in relation to his information services must be emphasized. In contrast to many of his industrial counterparts, he has access to adequate library facilities but not to an information department. He usually does not enjoy the type of service provided by information officers in industry. As a result, he usually has no experience, either of mechanized services or, more generally, or any kind of personalized service. He is not able to ask an information section to undertake a manual current awareness or retrospective search; he must therefore rely on his own resources or, more probably, the resources of his graduate students.

The conclusion that can be drawn is that university users must have personal access to someone who is an 'expert' at constructing profiles for the mechanized system. In our experience, the formulation of profile strategies involves a negotiated settlement of differences between what the user wants and the limited capabilities of the systems at present available. In other words, construction of a successful profile requires a fusion of the user's knowledge of his own subject and its special vocabulary, and the knowledge of particular mechanized services supplied by a 'systems expert'. I have no wish to become involved in the controversy, probably more apparent than real, regarding the relative merits of natural and controlled language services. However, there is one possible distinction between them which is relevant to the present discussion. In the case of a natural language service, the user knows more about the index language than does the system's expert, whereas the converse is probably true of controlled language indexes. Adequate use of natural language data bases, therefore, requires that the user must make a substantial contribution to the construction of his search profile. During the past three years we have moved in the direction of greater involvement of the user in profile construction. We would like users to have a greater understanding of the way the system works, in order to be able to make a maximum contribution to producing his own profile. There is little doubt that users who are prepared to spend a great deal of time on their profiles can almost certainly do without liaison scientists or information officers and may well produce better profiles than the experts. However, there is a conflict with another aspect of a user's requirements. In a questionnaire survey of research workers receiving *Chemical Titles* profiles, the users were asked to indicate what they considered to be the main advantage(s) of the mechanized service. Convenience and time-saving were nominated as advantages by the majority of the population, and far more frequently than any other advantage. It appears that the value of the service as seen by the user.lies not in its retrieval performance, in its ability to retrieve more relevant references than would have been found otherwise, but in the fact that the user receives on his desk every fortnight a nicely packaged list of references. It saves him having to remember to go to the library and, presumably, reduces the time spent in monotonous scanning of (say) title pages of journals.

On the one hand therefore, in order to get good profiles, we might wish to do away with information officers or liaison scientists and allow the user to do it all himself. On the other hand, if this involves the user spending five or six hours a week on his profile, then it is very doubtful whether he will judge it to be more *convenient* than his conventional manual methods. A compromise is necessary: we want a reasonable division of labour between an information officer (or equivalent person) and the individual user. We must therefore ask two questions:

(i) How can this labour be divided to produce the best results?

(ii) What aids are required both for the information officer in a university context and for the individual user? Such aids may be provided either by a service supplier or possibly by some other group. We need to consider what aids are required in order to make better use of the existing mechanized services.

One can speculate that, in future, the liaison function for university research workers might be fulfilled by an information officer, located in either a department or a university library, and responsible for the provision of mechanized services either to a whole university or possibly to a single department. Compared with the present full-time itinerant liaison scientists, such an information officer will have the advantage of closer contact with his user population. However, he may be able to devote only a part of his time to this type of liaison work and may have to handle several services. His experience with any one service will inevitably be limited. A major advantage of the present liaison scientists located at the Experimental Information Unit is that each may have written 150 profiles for a particular service and therefore has extensive intuitive knowledge of the detailed problems characteristic of that service. A mechanism is required for making available this extensive experience to the local information officer who may be responsible for 15–20 profiles a year for a particular service.

The type of search aids which might be required are illustrated by the following example. A profile written for a user interested in molecular sieves (synthetic zeolites), failed to retrieve a paper which referred to '. . . absorption on synthetic erronite . . .'. The author of the paper might be blamed for this retrieval failure because his title used a very specific name (erronite) but did not give the corresponding generic term. Alternatively, the failure could be attributed to the user for not informing the liaison scientist that erronite was a possible specific name for a synthetic zeolite. For example, the user had already thought of the specific term 'Chaubazite' and this was in the profile. However, one has doubts as to whether it is reasonable to place on the user the burden of thinking up all the possible trivial words that might be used in his subject area. We therefore need to ensure that a part-time information officer has access to the information necessary to deal with this type of problem. The particular retrieval failure used as an example might have been avoided in either of two ways:

(i) By the use of a word list or thesaurus in which molecular sieves or synthetic zeolites could be looked up in order to identify all possible trivial names associated with the subject.

(ii) By using an alternative search strategy. Thus, this particular paper and most others which referred to particular synthetic zeolites could be retrieved by the strategy:

SYNTHETIC [followed within one word by] *ITE or *ITES

This type of contextual logic is now available in the UKCIS Serial Search system. After the event, the above logical strategy seems the obvious solution to the problem. However, this strategy was not recognized when the original profile was written. Furthermore, it seems unlikely that the local information officer, especially if working in a part-time capacity, would have sufficient experience in profile construction to be aware of all the possible strategies which might be used for particular search requests.

It is suggested, therefore, that more sophisticated guides in profile construction are required which will provide information officers with the necessary background experience they are not able to obtain by writing large numbers of profiles, simply because they do not have a large number of users. In particular, we require more sophisticated and comprehensive guides to the type of logical devices which can be used, and to the vocabulary of particular natural language systems.

The problems of the individual user are of a different character to those of the information officer fulfilling the liaison function. It is necessary that the user should know in *general* terms what the service is trying to do and how he trying to do it, even though he will not be familiar with all the details of profile construction. Examples from ISI's ASCA service and from the UKCIS services serve to illustrate the barriers which limit the user's understanding of the system. It is of interest that both examples refer to characteristics of the system which are highly desirable in terms of retrieval performance, but nevertheless create special problems for the user.

The most impressive feature of the ASCA system is the use of a Citation Index, which enables searches to be made for either cited authors or cited references. However, in constructing ASCA profiles, we have experienced considerable difficulties in explaining to the user how the system works and in obtaining from the user the most appropriate citations. One suspects that our own experience is not unique. For example, the National Science Library in Canada is one of the few organizations searching both citation and subject tapes provided by ISI. During 1970 they ran approximately five hundred profiles against this data base but, surprisingly, only 40–50 of these profiles made use of citations, despite the fact that this is considered the outstanding feature of the data base. It is a reasonable suspicion that this under-use of citations is the result of lack of user education in relation to this particular index language.

Adequate use of mechanized services requires that individual users should know how the index system works, whether it be natural or controlled language. Profile construction involves the logical use of an index, whereas one suspects that most individual research workers, if they use indexes at all, use them in an intuitive, rather than a logical, manner. Thus, in a manual search, it is possible to skip from one index entry to another as new possibilities present themselves during the searching. In contrast, construction of a profile for a computer search requires that the user rigidly defines the required index entries and the co-ordinations between them.

A second example of user/system communication problems is provided by services operated by UKCIS using their Serial Search programs. The present version of the UKCIS Serial Search provides comprehensive logical facilities which probably satisfy all reasonable logical requirements for text searching. However, the introduction of increasingly complex forms of logic have increased the incomprehensibility of the system to the individual user. This can be illustrated by reference to the earlier example of a search strategy in which we wished the term SYNTHETIC to be followed within one word by *ITE or *ITES. Stated in this form, the logic will probably be understood by the user. However, in the coded profile we find:

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A2401TW+1/50   SYNTHETIC
A2401TA        *ITE
               *ITES
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The meaning of this coding may be self-evident to an information officer who is an expert in profile construction, but will be incomprehensible to many users, who can therefore no longer understand what the profile is trying to do.

There is a strong case for developing query-negotiation languages which are as close to natural language as possible and therefore easily understood by the individual user. If necessary, this could be translated into a second coded form more suitable for the computer search system. The individual user would only encounter the query-negotiation language and would need no knowledge of the coding language acceptable to the computer. Providing a translation program is available, there appears to be no reason why the user and the system should use the same language for expressing profile strategies.

In conclusion, I would like to return to the statement made at the beginning of the paper that the work of the Experimental Information Unit was service-oriented. Research workers were offered (say) a *BA Previews* Current Awareness service and the performance of that service and the reactions of users to it were studied. However, the majority of users have no experience of personal SDI or retrieval services, mechanized or otherwise, and therefore have no basis for comparison. In future, much more attention needs to be paid to the total information requirements of users, rather than to their reaction to a particular service. We need to find out the types of service required by a given user population: retrospective, current awareness, query answering or data provision. Different types of data base and different indexing capabilities should also be studied in the same, more general, context.

Thus we need to investigate mechanized services not in terms of a particular service and the reaction of users to that service, but in terms of particular users and their reactions to many services. There are at present only limited funds available for the purpose of mechanized services in universities. These funds should be spent in such a way as to give the maximum possible advantage to the individual user. However, this is only possible if users are given the necessary information and practical experience which will enable them to discriminate among various possible alternative services and, possibly, to influence the design of new services which may be more appropriate to their needs.

INSPEC

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MOST OF YOU have probably heard of INSPEC, but there are many people who do not seem to know the full range of what we do, so I thought I would just take a few minutes first of all for what I would like to call an educational session on INSPEC. I want to tell you what INSPEC is doing; to talk about the philosophy of our products and what we are actually trying to provide for the users. And then I shall end up by reviewing some of the problems that we have, as suppliers, in trying to satisfy your needs.

INSPEC—the name—began as the Information Service in Physics, Electrotechnology and Control. Since then we have added additional words to it—International Information Service in Physics, Electrotechnology, Computers and Control. INSPEC itself is a department that is operated by the Institution of Electrical Engineers; it has been offering information services—secondary information services—since 1898. The original title was *Science Abstracts,* and these started in the field of physics and electricity. We now have one of the larger services operating a computer based discipline-oriented service which provide a variety of operations. The service covers physics, electrical engineering, computers and control, and we have altogether something like 124 people working on the service with five hundred abstractors abstracting information. The sources which we used in 1970 were 2,000 journals, 600 reports, 9,000 patents, 5,000 theses and 500 conference reports. All in all, we are processing 140,000 abstracts per year. Table 1 shows the growth of the abstracts from 1957 to 1971, when we will be processing 143,000 abstracts through the system.

Year	*No. of abstracts*
1957	16,452
1962	42,091
1968	88,440
1971	143,000

TABLE 1: *INSPEC growth*

The products that we produce are as follows: magnetic tapes; three abstracts journals, to cover the fields of physics, electrotechnology, computers and control; three current awareness journals, which list the current papers or the titles; SDI services, covering one or more of the three data bases that we have; and standard profiles. We are also working on experimental information retrieval fields. So the range of products that we have represents a fairly good manipulation of the data being processed.

I would like to discuss now the philosophy of the various products themselves. We feel that the abstracts journals as they stand, where one is talking in terms of a £100 subscription or so for each particular data base, provide the retrieval, the printed index search and retrieval tool for library use. The current awareness services, which again are in a printed form, provide rapid coverage of the material, but at a price which is more reasonable for the smaller unit; these cost about £12. The Topics service, which I mentioned above, is really standard profiles arising from the SDI service. We started an experimental service last September with twenty-two Topics which cover areas where there was a large activity in R & D. We analysed the throughput through the data base to find those areas where there was a lot of activity, and we then generated standard profiles which we now market in a very cheap form on 6 x 4 inch cards, which can be used for filing in normal file index boxes. The Topics' costs come out at about £18 which is approaching the lower price level that Dr Dammers was talking about for the standard profiles. Typical Topics' subjects cover lasers, computer-aided design—general subjects in which there is a large amount of activity.

Finally, we have the SDI service where we can obtain very complex individual profiles, some of them having up to sixty or seventy terms actually defining the profile. The price level here again reflects the level that Dr Dammers was talking about—between £65 and £105, according to the data bases that one is actually searching.

Then there are the tape services which we provide to about eight or nine countries throughout the world. These are used by centres in Sweden, Canada and Japan to provide local information services. One point that requires consideration is the role of these particular centres in relation to the smaller organizations—for example, are they a good thing?

That is basically what we do. But what are the problems that are really facing us when we try and make packages for the actual users? I have listed a number of them, as follows: First, there is the question of currency—are we fast enough? Then there is the question of coverage—what should be our overlap with other services? How do we define this? How can we improve it? There is also the problem, which was mentioned earlier today, of selling information products—are the budgets available? to whom do you actually sell?—problems that actually make it very difficult for us to get in and make sure that we are talking to the right people, and that the people appreciate the need for information.

Then there is the problem of commercial security. If we are running SDI services for the user, is the user going to be happy that the commercial security that we can offer him on the profiles is going to be good enough? This comes back to another point—for instance, are there many organizations represented here today that are still producing their own internal abstracts journals? Should services like ours be offering you specialized output in the form, say, of ready-made stencils which can be used to operate your own local abstracts journals?; for we realize we cannot put all your local material in, since some of it is confidential. However, we may be able to supply the core to you which you can just add into your normal abstracts journals.

There is another problem that we have encountered, but which we do not quite know how to solve, and that is the question of photocopying. We can supply an SDI service but we do not know what happens to it after it reaches the user. At the moment we can only hope that everybody is honest and that they do not photocopy this material and distribute it. There is the question of whether we, as a supplier, should concentrate on what you might call wholesale information packages, where we sell to organizations who then run their own services, or whether we should run retail services as well as wholesale. In this respect, we have decided on the philosophy that by running retail services, such as our own SDI service, we can get valuable feed-back on what users need in order to incorporate it into the service itself, which in turn improves the service to you. So, in reply to the cry 'The suppliers are not producing what the users want', we say, 'Well, what *do* you users want?' And again we come back to the point that nobody knows exactly what the users want and the problem then remains. And this is why we feel that, with the range of products we now have, our immediate goal is not to develop new products but to try to tailor the ones we have more to the requirements that the users express. The only way that we can do this is by having a continual dialogue between ourselves and the users, and this refers back to the problem of how can we get the services into the users' organizations. We have got to keep talking about what the users need and try to make sure that any special requirements can be reflected in the service that we give.

There was a point made earlier about consistent indexing. On this question I think I can give a ray of hope, inasmuch as there is a lot of work going on in areas such as the ICSU (International Council of Scientific Unions) where we are trying to establish a common international classification in the physics field. We have reached a point where we at least have a draft; whether we will be able to implement it is another matter. It is a very slow and tedious operation because we are working with the Russians, the French, the Germans, and also the Americans, so we have all the problems that we have in our own system multiplied five times. We are also working with the IEEE in the United States in the area of electrotechnology and computers and control to develop common classification and common indexing approaches. So this is another area where there is hope.

I will now move on to the question of quality. We are very conscious of what quality we should include in our service—obviously we want the highest. The user does not want to receive what he thinks is trash, but the question of who decides what is required is a very difficult one, because what may apparently be a duplicate article may have one or two items in it which just make it the article that somebody really needs, and he may not know this; so we tend to err on the idea of putting in more rather than less.

Then there is the problem of the new areas: how do we see the growth of data bases? do we see our own data base expanding? Well, we do, particularly in the area of patent-associated literature; we also want to examine much more closely the field of technical and commercial information which we feel is lacking from some of the services that are existing at the moment.

So, very briefly, these are some of the problems which are occupying us, and you can see, I hope, that they are not problems that are capable of an instant solution. They really need your help just as much as we want to help you, and I know that we can count on it.

EXTERNAL INFORMATION SERVICES AND THE SMALL USER

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Paper presented at a one-day symposium on Problems of Using External Information Services (Session 2: The view of the supplier), Royal Aeronautical Society, 16th June 1971

A PLEA that I heard during this morning's session was that nobody had really addressed himself to the small user; everybody had been talking about the big user of the data base. And I just wondered whether in the short time I have I can possibly say anything useful in that connection. So will the professionals please excuse me if I try to address myself to the small user for the moment, and in particular to the unfamiliar user—if there be such an animal.

What then are the problems of using external services? Let me say right away that, despite any apparent discrepancy between title and abstract (an effect which is not wholly unknown even in the scientific literature) external services are by no means wholly confined to computer services. There are many non-computerized external services; and may I say without my tongue in my cheek, that I am very glad there are, because I think for a long time to come we need to be able to make occasional comparisons. However, because this is my own particular last, probably most of what I say will be recognized as bearing on the use of computerized services. I hope that some of it will also have a degree of generality.

In using an external information service, there are two limbs to the users' problems—as there usually are, I think, in any situation of choice. There is an economic limb and there is a technical limb. And in accordance with the well-known laws of cussedness, the solution indicated from one point of view always moves in the opposite direction from the solution that is indicated in the second. This is in the nature of things and we all have to face it.

Let us look at the economic problems first. What the poor user has to decide is what is cost-effective for him. This does not mean what is necessarily 'best' from the criteria of Cleverdon, or what is necessarily the cheapest by the criterion of his company accountant. It really means, in ordinary domestic terms: how does he get the best value for money? Price is involved of course, but the basic question that confronts every manager, and indeed every housewife, is this: at what point does do-it-yourself cease to be cost-effective? Take the case of a housewife. If she is a good and fast and skilled dressmaker it obviously pays to make dresses and pay someone else to scrub the floor. But clearly we may come to that point in social development when the price of scrubbing floors is so much higher than the price of external dressmaking that the poor housewife, whether she likes it or not, has to get down and scrub the floors and put out the dressmaking. It may be a rather homely parallel, but the same situation exists when you consider using information services. Nor of course is it an 'on–off' question. One's choice may certainly not be 100 per cent do-it-yourself or

100 per cent external service; it is bound to be a judicious mixture of the two, i.e. if you are looking for total cost-effectiveness. Now what are the factors affecting this decision? I will mention two as examples in the hope that they are cogent ones, but I must stress that they are no more than exemplary. (You will certainly be able to think of others.)

The first one, I think, is this: to what extent does the external service cover your local subject needs? And the second one is: to what extent do those external services quite clearly proclaim where they begin and where they leave off? Now this second question is clearly important to the local housekeeper, and it is a matter to which I think several services might give more attention. It is a very difficult one, indeed so difficult that I think there might even be room for a world debate on the simple single issue of whether the secondary base should consist of (a) absolutely cover-to-cover rendering of every journal that it claims to treat, or (b) whether it should continue to do what most of them do now, which is to give selective treatment of a stated area of endeavour.

Those of you who are at all familiar with the tenets of indexing will, I think, see the immediate characteristics of those two possible ways of designing a data base. If you say: I cover everything from a certain list of journals, even though by some curious mischance some misfit article has got into the journal, then the user of the secondary source really does know that he need never go directly to those journals himself. If, on the other hand, you say: I am trying to cover anything that says anything about chemistry—no matter where it comes from—then *your* bounds of chemistry will not be *my* bounds of chemistry. And no matter how much explanation is offered, there will be a shady area where you cannot know for certain whether it is covered or whether it is not. And this I think places you in an unsatisfactory position, and calls for the secondaries to be at least as explicit as they possibly can be.

Now, side by side with coverage, which is an important economic factor, there arises the form and the extent of the item representation that the service provides. Let us assume that there is already enough descriptive matter in the shape of text or index terms, or keywords, or what you will, to enable the service to make a reasonable job of item selection; that is to say, it will give you items that are at least 50 per cent relevant to your question. There is then the question of how much information you are prepared to pay for, to have attached directly to those items, when posted to you. Now, one of the earlier speakers said that at present about 60 per cent of the cost of a computer profile is computer time and this is a figure I would not seriously dispute, since I am not going to quarrel about plus or minus 5 per cent. But I would add this: that unless the user is satisfied with what I call 'minimal item identification'—that is to say, a few characters that enable him to go to a page in some printed publication or another—then assuredly the computer costs will be 60 per cent of the total. But, if he will take minimal item identification, and go and use the library for his relevance check, the computer cost within that profile will go down to about half what it was before. For, so long as we are tied to computer printers as a way of printing out search output, the printing is about half the cost of the total job.

Now I know that convenience was stressed. It was stressed by Dr Leggate and I agree with him entirely: but how much is convenience worth? It is not worth the same to everybody. Of course, there will be people who say: 'Find out the whole lot, print out the whole abstract if you've got it; I don't want to bother to go to the library'—and they will pay for it. Equally, there are others in quite the opposite situation who will say: 'Well, my office is next door to the library, I know we always get our *Chemical Abstracts* quickly; give me some numbers, I don't mind going in and looking them up'. And indeed the observation was made earlier that, having had their items retrieved, people liked to go and look at *Chemical Abstracts* and check on the relevance. Well, I agree, but I would add this: if people like to go and look at *Chemical Abstracts* to check their relevance, there is no point in printing out a title for them, still less in printing out the whole of the bibliographic reference. Why do I say this? Well, first, to put the really new and the really unfamiliar information officer a little in the picture. Secondly, to point out and stress what so many people said earlier—that we are still only in the dimmest of communication with the customer, and with a very, very small number of them at that. We do not know what the general consensus is, and it is only through the customer expressing his market tastes, reacting to our prices, being good enough to put his objections, likes, and dislikes, into letters to us that we can work towards the greatest good for the greatest number. For, as can be seen quite clearly, a Ford Escort that is made in thousands is a greal deal cheaper than a Rolls Royce that is made in ones. I appreciate that there is a difference in quality, but nevertheless they both perform the basic necessity of getting from A to B, with more or less equal reliability.

May I now turn to what I term 'the technical limb', and it is here, I think, that probably most of the trouble occurs. Perhaps because it is a trouble that can at least be understood, even if it is not easily surmounted. The problem is, of course, wholly one of communication, and it exists just as much in a non-computerized external service, as in a computerized one. It is simply and solely the fundamental human problem of telling someone else *exactly* what you want.

If you get down to doing the job yourself, you do not take time off to tell yourself what you want. You start off by thinking that you know what you want, and without ever admitting it, before you are five minutes on the job, you have changed your mind about what you want. You thought you knew what you wanted quite sincerely, but something happens on the way down the road that tells you that you were not going in quite the right direction—for example, you do not, after all, like the look of the pub over there, but think that that one over there looks as if it might be cleaner, and you do indeed change your mind as you go. Now of course, if you are using a human interface in an external manual service you can, if you have a change of heart, go to the 'phone; but of course you will not have experienced the influences that your external searcher is experiencing when he is trying to do the job for you, so you do not get the same opportunity to change your mind. So to all intents and purposes you have got one 'stab' at him, and at that stab you have got to tell him what you think you want.

Now here I draw the essential distinction between talking to a human and to a computer. We are all slightly lazy people, and if the person we are employing to do the manual search shows the slightest glimmering of common sense and understanding, we are the first to rely upon it to the maximum possible degree, and possibly to a quite unwarranted degree. Consequently, being busy people, we say: 'Oh, I want the facts on so and so; I'm off to a meeting', and the poor chap has to get on with it. And we do indeed rely on his common sense. But, when we come to the computer, it is no good saying to it: 'I want the facts on so and so; I'm off to a meeting', for I well remember one profile that I had and no amount of argument on my part would persuade the enquirer that he was interested in anything except calcium carbonate. Needless to say, he did not find very much information, although in fact there was quite a lot of information there.

I do not want to harp on all the various difficulties of compiling profiles, because clearly the details of those difficulties will vary from system to system and whether it is free text, whether it's structured, and whether it's controlled or uncontrolled vocabulary. I just want to try to summarize what underlies the difficulty, so that you can all exercise your own imagination and see what those difficulties amount to for you. And of course it is simply and solely this: that the only thing the computer can discern is symbology; that is to say, characters, numerals, spaces and punctuation marks; those are the only things you can tell it to look for, and it is quite useless telling it to look for anything else. It can only find your items by character matching. Consequently, you are only telling half the story if you say that you are interested in the diseases of dogs at large, because, unfortunately, what the article speaks of is the illnesses of Alsatians, and then you will be lost. You have got to bridge that gap for it—unless the data base is so well established and so supported by what I would call 'supplementary linguistic support' that there is some kind of an automatic built-in look-up system, which will say to itself: 'This inarticulate fellow has asked for dogs; what have we got that means dogs?' Of course, with experience of questions and large data bases, this can be built up, but few of us have done it yet; many of us have plans for doing it—the overhead attaching to it again is very large, and those who want these expansions built in will undoubtedly have to pay more than those who are prepared to exercise the necessary imagination themselves. So, once again, I must stress that it is a matter of what you are willing to pay for and what you are willing to do yourselves.

Finally, I would like to say one or two things about a few of the wishes and hopes that were mentioned by earlier speakers and to tell you something of what we are expecting—at any rate on the chemical side—in the fairly near future. Mr Robinson referred to the present difficulty of performing retrospective search and I entirely agree with him. I want only to say for the moment what the chemists are doing about this, but I see no reason why others should not follow. It is the plan of *Chemical Abstracts*—I think starting in the middle of 1972—that their so-called 'issue index' will be considerably expanded, as will the kinds of aspect from which the item can be approached; and at the same time the printed copy will be reproduced by computer typesetting. This means, therefore, that the whole of the data upon which that index is based is available in machine-readable form, and the index itself will therefore become available in machine-readable form. Obviously there are other spin-off benefits here in that, firstly, the production of those issue indexes will themselves be very much speeded up, so that at worst they will lag no more than six months behind the issues of *Chemical*

Abstracts to which they relate, and secondly, existing as they do in machine-readable form, the facilities for merging them together and turning them into a decennial index, or a triennial one if decennial is too big, are obviously very much greater than they were before, so that in the long term we may also look forward to very much faster cumulative indexes.

I personally believe, subject to a bit of further digging at Columbus, that *CA* index tapes will become one of the prime retrospective tools for the chemical literature, and that the need to create a quasi-retrospective tape out of the current-awareness issues will probably be restricted to covering just the last few months which exist between the immediately current issue and the last volume index. These developments will bring you new riddles in cost-effectiveness.

ATTITUDES IN PROMOTING AND USING EXTERNAL SDI SERVICES

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Paper presented at a one-day symposium on Problems of Using External Information Services (Session 2: The view of the supplier), Royal Aeronautical Society, 16th June 1971

MANY SCIENTISTS have routine information-seeking habits, which probably have not been subjected to the scientific scrutiny which they devote to their own subject. Neither they, nor in the case of industry, the management, have assessed the value of timely, relevant, scientific information. On the whole they do not want information, although they need it. There are, of course, notable exceptions to this generalization.

Under these circumstances it is not surprising that it is sometimes difficult to convince a person or organization of the benefits of an SDI service. Once convinced, another difficulty is at once encountered—the problem of encouraging, cajoling, and persuading the user to circumscribe his subject with a proper profile.

It has been frequently stated that information scientists are bad communicators. I would also add that they are frequently bad salesmen—and yet SDI services must be vigorously promoted. These weaknesses account in part for the fact that scientists are often ill-informed about SDI services.

The benefits of SDI have been well described in many published articles and case histories, but these are not read by the researcher who is engrossed in his specialized literature.

However, once two or three profiles are running in a reasonably enlightened environment, the word gets round and the system is quite likely to take off. Tens and even hundreds of profiles follow.

This simply confirms that a very well conceived educational and sales programme is essential. As the 1969 SATCOM Report puts it (p. 52). 'The general belief of the scientific and technical community is that information need not be marketed; if the information is valuable people will find it. In fact there is little basis for such a belief'.

Very little information exists which shows that a service such as ASCA, which, by the way, covers the whole of major science and technology, exceeds the cost of any other comparable service, so the word 'expensive', applied here, is unjustifiable. It arises because users are totally unaware of the cost of time spent, time wasted, and performance, during the creation, running, and use of their existing information system.

I suggest that the word 'expensive' really means that 'I have got to find the money for this service, whereas I can somehow loose my present costs within the organization'.

An enlightened information division of a company will assume the SDI costs, and consequently reduce some of its existing costs. Any fears that their function might be by-passed in some way disappear, and the prestige and effectiveness of the division increases.

Given that sales and education are first necessary, we come to the next stage—profile formulation—and here again there are difficulties.

I do not believe that profile construction itself is a difficult operation—as is sometimes alleged. I am certain it requires painstaking attention well within the capacity of the average scientist. Somehow he must be convinced that timely, relevant information is valuable and therefore that several hours of his time are entirely justifiable for compiling a profile.

At ISI we try to put out good descriptive information summarizing the classes of terms available in the ASCA system and suggest that the scientist assembles a collection of recent documents about his subject—a collection which he will surely possess. We suggest that he seeks title and citation terms common to clumps of articles, on the assumption that if 80 or 90 per cent of those documents would be selected by the chosen terms, a good proportion of articles, as yet unpublished, will be selected by using those same terms in the SDI service.

It is very beneficial to have on the scene a person who is half-way between the scientist and the system—a librarian or information officer—to assist in this process.

The information officer can clarify the rules of the system and encourage the scientist to use it to the best advantage. However, only the scientist can finally choose that collection of terms which circumscribe the subject neither too specifically nor too broadly, having first been carefully advised about the available choices by the information specialist.

Yet another difficulty assails the SDI entrepreneur. Unfortunately he cannot always expect the co-operation of the local library or information staff. Sometimes an impenetrable barrier is placed between him and the scientist—he is regarded as a nasty symptom of the computer age! Profile compilation under these circumstances proceeds without the presence of the scientist—not a good omen for future success. Fortunately such cases are becoming rare.

The last, but very important event, is the revision work which must be done on the profile from time to time in the light of results. Again this is often neglected by the user, and he must be prompted by the information officer or supplier.

To summarize, the right ingredients for promoting a successful external SDI service are:

1. Very good descriptive and educational material, coupled to explanatory lectures.
2. A discarding of any feeling that sales is not respectable. SDI services must be properly sold in the best sense of that word.
3. Good co-operation between the supplier, the intermediary and the scientist during profile compilation.
4. Periodical profile revision prompted by the supplier or the intermediary.

To pass on to new developments, on-line interactive information retrieval is now publicly available through the dial telephone network.

Unquestionably the question and immediate answer dialogue with this system, introduced by Cybernet/ISI, gets rid of some of the 'arm's length' disadvantages of conventional SDI systems. At present the user pays a premium for this new degree of freedom, and we await user reaction with great interest.

ISI will shortly introduce other improvements. We have undertaken to cover the prime journals of Sociology during 1971, so ISI Source/Citation tapes, *Science Citation Index*, and ASCA, derived from the tapes, will of course cover this field. The same field will be further widened in *Current Contents, Behavioural, Social and Management Sciences.*

THE INTERNATIONAL FOOD INFORMATION SERVICE

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Paper presented at a one-day symposium on Problems of Using External Information Services (Session 2: The view of the supplier), Royal Aeronautical Society, 16th June 1971

IN THE PREVIOUS papers, we heard some of views of the 'large' users and we heard something about the approach of the 'large' suppliers to both the 'large' and the 'small' users. I'm glad to have the opportunity now of saying a few words about the 'small' supplier. The International Food Information Service (IFIS) is very definitely not yet in the big league. We process and publish a mere 16,500 references per year, which is small fry compared with the 140,000–250,000 references per year dealt with so far.

The International Food Information Service differs from the other organizations represented here today in several quite significant ways:

(1) It is an *international* organization. IFIS was founded in 1968 by the Commonwealth Agricultural Bureaux (CAB) which is based in the United Kingdom, the Institute of Food Technologists (IFT) in the United States, and the Institut für Dokumentationswesen (IDW) in West Germany. In 1969 these three organizations were joined by a Dutch organization—Centrum voor Landbouwpublikaties en Landbouwdocumentatie (PUDOC). These four organizations undertook to support IFIS up to September 1971 by providing cash and/or services. The two organizations most intimately concerned with the day-to-day production work are CAB and IDW. The former is concerned with the procurement of abstracts, the indexing of these and the editing of the material. The latter is responsible for the computer processing and printing of our main journal—*Food Science and Technology Abstracts*. We are international in another sense because we have made arrangements with outside organizations for scanning and abstracting the world food literature. For example, we have major working arrangements with organizations in Czechoslovakia, East and West Germany, Japan, the Netherlands, the United States and Canada, and we have arrangements with many individuals in Italy, the United States, Hungary, Denmark, New Zealand, Brazil, South Africa, etc.

We have other arrangements in the United Kingdom with co-operating organizations, e.g. the National Lending Library, Tropical Products Institute, Woolcott & Co., and the British Food Manufacturing Industries Research Association. In addition we have contact with over fifty part-time abstractors. This raises the question of standardization and co-ordination—how to avoid overlap of coverage by the different organizations, yet maintain uniform quality of the material produced. This does tend to limit our working arrangements with other secondary-publication organizations. On the one hand, because the nature of the abstracts that are published by two different organizations tends to be quite different—the abstracts are aimed at different individuals and markets—so they are not easily exchanged between one organization and another. On the other hand, organizations often have substantially different working procedures, and it is not always possible to accommodate output from one organization in another.

International arrangements do have very definite advantages as well as some disadvantages. The advantages include representation in many parts of the world. We can, and quite frequently do, receive comments and opinions from a very wide range of food scientists, who are intimately involved in our work not only in the UK but from throughout the world. We also have very close contact, through our many co-operating organizations, with the people that are using our services. Some disadvantages, of course, arise because of the relatively loose ties that have to exist between the many organizations that are involved, and because of the political nature of many of the arrangements and discussions that have to take place. However, it is my opinion that, despite a few problems that exist, without such international collaboration the International Food Information Service would not exist at all. This leads me into the second major characteristic of our Service.

(2) We cover a *multi-disciplinary* subject. We have to deal not only with aspects of chemistry and physics, but also biology, botany, zoology, engineering, economics, psychology, etc.

The number of potential customers is smaller than for many basic science services. Our potential sales obviously are smaller, and our unit costs are likely to be rather higher than in the basic science services. At present, we are processing about 17,000 references per year, which we obtain by scanning around 1,200 journals. We cover patents from about twenty countries and we cover books as thoroughly as we possibly can. At present, we sell less than one thousand copies of *Food Science and Technology Abstracts* at the present cost of £75 per year. The subscription, in fact, will rise next year by £25 per year to cover increased costs due to a 35% increase in numbers of abstracts since the price was set at £75. The size situation does have some compensations. As I mentioned earlier, we are in fact very close to our customers, and I believe we can provide our customers with a service which is very much more complete and relevant to their needs than some of the larger organizations. Our subscribers do not have to wade through a tremendous amount of material in order to find the items that interest them. Of the seventy-plus subscribers in the United Kingdom we are in extremely close touch with over a half of them—by close touch I mean that we have visited or been visited by them, seen them at conferences, etc., three, four or five times in the past year, and of course we correspond as well as being in direct contact. Again, this helps us to provide the sort of service that they need. At the same time, I am not saying that we have solved the problem of using external information services. No one of our customers is likely to be entirely satisfied with our coverage: they want more chemistry, or they want more biology, or they will disagree with what we think a food is. It's because we are dealing with a relatively new multi-disciplinary science that our selection problems are as great—or may be even greater—than anywhere else. What we produce has to be a compromise, and the compromise has to be arrived at so that the maximum number of people can and will share in the cost of the production of our services.

I would like now to describe some of the services offered by IFIS:

(*i*) I have mentioned that our main product is *Food Science and Technology Abstracts*. This is published monthly, contains about 1,400 abstracts per issue, and has a very detailed subject index and an author index in each issue. The subject index is basically a KWOC Index. It is computer-produced, but it has manual indexing input. The material is computer-processed and printed in Frankfurt. At present printing is done by Linotype, but we are re-programming in order to print by a Linotron film processing system.

(*ii*) The magnetic tapes that are produced on the way to the printed version are obviously a by-product and they are available for sale. We are modifying the format of these magnetic tapes in order to make them more easily searchable. The crude tapes tend to be rather cluttered up with printing control signs, and with special codings that are needed for Greek letters, subscripts and superscripts—the sort of things that make the printed version very much easier to read, but which makes computer searching that much harder. These tapes are available at about £700 per year.

(*iii*) During the past year we have been operating a free, manual, selective dissemination of information service to twenty-five organizations in the UK. This has been supported by a grant from the Office for Scientific and Technical Information in order to study the extent of our coverage of the food literature and to develop and compare different techniques for retrieving information from our data base. In the course of this project we have been working with Dr Kent at UKCIS to produce software for computer-searching of our magnetic tapes. This SDI service has just been made available commercially. We are at present doing the searches manually and as they come in we will decide whether it is worth doing them by computer or whether, in fact, it is easier to do them manually. To provide a satisfactory service of this type, we believe we need extremely close contact with our customers. We feel we have to know exactly what they want before we can apply our own particular know-how of what is in *Food Science and Technology Abstracts* and how best we can get it out. The cost for this service starts at about £10 per year.

(*iv*) Retrospective searches are also provided by us; it is not our intention to mechanize these in the immediate future. We find that on our present size it is better for us to do them manually. Charges are from £5 per year searched.

(*v*) Retrospective searches that are likely to be generally popular may be offered for sale at specially low prices, as *Food Annotated Bibliographies* (*FABs*). *FABs* now available include some on: Reverse Osmosis (£1); New Sources of Food Protein (£3.50); Natural and Synthetic Sweeteners (£2); Techniques for Analysis of Flavour Volatiles (£3.50) Microwaves in Food Processing (£1); Texture Analysis of Foods (£4.50) and Synthetic Dairy Products (£1).

(*vi*) We have a very active photocopy service (7p per page) which seems to be by far the most popular of our additional services. Many people write in to us and ask for a copy of an original article which we can then provide. We did at one time offer original articles on microfiche. This was done in collaboration with the National Lending Library for two years, but had to be discontinued.

In this case, the indications were that we were simply ahead of the times; there was absolutely no demand for original articles and abstracts on microfiche, so this service has been suspended.

In general terms, we are open to suggestions as to the sorts of services that are required by our subscribers, but unless we can make some saving by processing for multiple sale, quite honestly it is cheaper for the users to provide the services themselves. We are always pleased to have comments from users—we encourage this, as I have tried to indicate. Right now we are in the process of establishing a more formal users' panel which is similar to something that Chemical Abstracts established a few years ago. The idea of this is to receive a harmonious statement of what the users require, rather than to get individual statements from users and be pushed from pillar to post by the influential, or the potentially rival, groups.

A REVIEW OF THE MAIN PROBLEMS

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Paper presented at a one-day symposium on Problems of Using External Information Services, Royal Aeronautical Society, 16th June 1971

ALL THAT I wish to do in this talk is to set in some context some of the things that have already been said today, and add a few comments of my own, in order to provide a basis for further discussions. It has been suggested that we ought to declare our interests, which user 'cap' we are wearing: I will try to speak as a librarian/information officer, faced with the world literature and its records—what should one provide in order to serve best one's organization's users? And in doing this, of course, one has to keep in mind that the ultimate user is the person who actually wants the information. I was rather struck with Dr Matthews saying that the computer as a tool for information might rival the telephone system in importance, thinking that the telephone is a way of putting one person into communication with another. For we, as information officers, must always remember that this is our job as well, even if through the intermediary of a document. So a computer is only a tool that can aid this person-to-person communication. I think, therefore—as was also suggested by earlier speakers—that we should not simply look at magnetic tape files in isolation, but we should think of them as one of the ways in which the multitude of bibliographic references are now recorded—a novel way, a way which offers great opportunities for doing new things, but not to be looked at to the neglect of all the other varieties of bibliographical sources.

The librarian/information officer coming into the field and thinking about tape services for the first time, needs to know what services are available, and what their characteristics are in terms of coverage, and so on. Mr Robinson mentioned a recent survey by Carroll for the American Institute of Physics, which is a very good lead to forty-five or fifty services. There are at least that many again which are available, mostly English language services. They are mainly restricted to science/technology, but there are beginning to appear on tape files of material outside the field of science/technology. For example, *Psychological Abstracts* now has 100,000 entries on tapes, which it is shortly proposing to market. We find that a good way of keeping up to date with new services is to use the *News* from The Federation of Science Abstracting and Indexing Services that Stella Keenan produces in Philadelphia, which is not restricted to the news of the situation in the USA.

This, then, is the size of the problem we are faced with: the fact that we have now identified at least ninety services, of one sort or another, at least half of which have tapes that are purchasable or leasable, while the other half are supplying services from the tapes and may make the tapes available later on. It has already been mentioned how widely the files range in size, from over a quarter-million entries a year down to 10,000 a year or less. For about seventy-five services we have detailed information, and for these we have made a rough estimate of the number of references that are getting onto tape at the present time: it comes out at about 3½ million references a year. This must mean that of all the current English language bibliographical records that are now published, 80 per cent must be available on tape. The total number of references now on tape, if you include records made in previous years, is approximately 15 million. So there is a huge wealth of material there and it would be a tragedy if all the effort that has gone into this mass of bibliographical material were to be dismissed with the statement that 'we tried it and it's no good'. The answer is surely that we have not tried hard enough; we have not yet discovered the best use of all this material.

One point about cost: roughly speaking, to purchase an abstract on tape costs about ten times as much as purchasing it in print—that is to say, if you buy tape, a median cost figure is about £40 per 1,000 entries on the tape, whereas if you buy printed abstracts, the median figure is more like £4 per 1,000 entries. So there is this extra cost of buying it, plus of course the cost of processing it, which is more difficult than just reading abstracts. Moreover, it is the information service that has to process the tapes, whereas reading the abstract can safely be left to the user. Information on tape, therefore, is not cheap.

The second aspect I want to stress is that we must think in terms of a great variety and flexibility of ways in which this machine-readable material can be used. Most of these ways have been mentioned at one time or another during the day. There is, first of all, remote use, i.e. somebody else has the tape, either the originator or a retailer (if you like the word) such as UKCIS, who is prepared to process the tape on your behalf. Remote uses of tape include, first of all, demand searches, such as putting a question to MEDLARS; secondly an SDI service, as has been mentioned a number of times, and here again I think not quite all the possible modes of SDI have been considered. First of all, one can get individuals in one's organization to use SDI—individual SDI profiles as provided by some external service; this has been mentioned as having been tried by a number of people with varying success. Secondly, one can get a group of individuals inside one's organization, such as the laboratory staff, to have a group profile, which may be cheaper and which provides each individual in the group with a wider range of material, not all of which is relevant to him. Thirdly, there is the possibility of getting a profile that covers a whole organization, and providing tape material that may be useful to that organization, and using it in some way locally. This, as far as I know, is not a method that has been mentioned today, but may well be considered by organizations with narrow subject scope. The fourth way in which remote use of these tape files is being handled is by the production of bulletins produced from standard profiles. The National Aeronautics and Space Administration, for example, has about 150 standard profiles from which it produces printed bulletins for distribution. Demand searches and SDI profiles are thus two of the ways in which tapes can be used remotely. A third way has been very briefly mentioned as just coming into use—on-line search of a store held by an agency.

When one comes to think of what one can do locally with tapes or products from them, there is first of all the basic alternative of purchasing either a printed output or the tape itself. I have mentioned the relationship in cost between an abstracts journal and the tape from which it is derived. Whether one prefers to get printed sources or tapes will obviously depend largely on both the size of one's field and the size of one's resources. The larger industrial firms who have been speaking today have mentioned the use of tapes—getting the complete tapes from suppliers as they are produced and using them in the first instance for local SDI and in the second instance to provide, hopefully, some form of cumulative file which can be searched. The technical and economic difficulties of retrospective search of a large computer file have been mentioned, and interesting alternative ways of providing for retrospective use—for example, by some form of cumulative print-out (one on microfilm was mentioned by Mr Robinson). This flexible and imaginative way of trying to produce from the tape, local tools, not necessarily machine-searched, which can serve the needs of one's own organization, is something that we will need to think a great deal more about.

In fact, one of the problems that is apparent from remarks that have been made today is that, whereas one can obtain regular tapes and produce an SDI service from them, yet because these are not easily cumulated and because of the problems of retrospective search, one is not left with a retrospective file that can be used for back searches. Either one has to use other sources such as printed abstracts journals, or go on maintaining in some way a manually developed system of one's own. So the problem of using a tape source for current awareness, which does not at the same time provide you with a retrospective file, is something that needs a good deal of thinking out. One possibility that is being envisaged in a number of organizations that are themselves information services trying to serve a scattered clientele—like a special information service—is the possibility of taking material from the main disciplinary tapes such as *Chemical Abstracts,* INSPEC, and so on; extracting material from those tapes which can be merged in some form, repackaged and re-issued to suit the needs of a special group of users. The problems here, of compatibility, of standardization, and of possible re-indexing in terms which suit one's own particular users, are all very far from being worked out.

By running through all these different modes of use, I have tried to emphasize the need to think very flexibly in terms of all the different ways in which it might be possible to make use of these tapes, and not to judge them simply by saying 'We've used them in one particular way, and that wasn't satisfactory, therefore computer-based search is a waste of time.'

The problems as to the choice of tape services are equally great. One general problem of quality versus quantity has been raised: some people have said 'Never mind the quality, feel the width', and others have, on the contrary, suggested that quality is the most important feature of a service. One point that has not been mentioned, I think, as regards choice of service, is that there are alternative sources of the same file. For example, as well as UKCIS having Chemical Abstracts Services, there are of course individual industrial firms that have them, and there are other commercial services available on the other side of the

Atlantic, anxious to be contacted by Telex, which are also offering to search Chemical Abstracts Services and indeed other tapes. So there will in fact be some competition for both SDI and demand searches from the same file, from different agents in different parts of the world.

Another problem is that there are different files of similar coverage which are now competing with each other: for example, MEDLARS and Excerpta Medica must overlap a good deal. INSPEC and the American Institute of Physics' SPIN are overlapping to some extent in the physics field. As a result, there will be two different tapes each constructed according to a different format, with different indexing policies, and so on, which will be competing for attention.

The fact that for an individual specialist information officer it is unlikely that any one tape is really going to cover his needs, is very important. At Aslib we have been doing a little investigation into one particular specialist information service to see the extent to which the big disciplinary tapes do meet the needs of this service, and we find for example that *Chemical Abstracts* covers 50 per cent of the references in which they are interested; *Biological Abstracts* covers perhaps about 70 per cent; while the ISI covers another range. Between them they overlap a good deal. There are also references in which the service is interested which are not covered by any of the major tapes. So if such a service were to say: 'I want to rely on material that I get from the major services in order to meet the needs of my particular users', they would be faced with the problem of tapping a number of services in order to get all the materials that they want; of an overlap between those services that would have to be eliminated if it were very high; and with a range of material not covered by any of these services, and which would still have to be picked up by the scanning of primary journals. So this problem of how to organize one's use of these tapes in an economic way, so as to get what one wants at not too great an expense, is very serious.

The final question is indeed that of cost-effectiveness, which Dr Batten has discussed; that is, the costs and benefits of the whole operation of using external services. Some of the costs are fairly easy to indicate, for example, the external payments that you have to make to buy the tape. The internal processing costs can be worked out, in order to give some idea of the cost, say, of actually providing an SDI service. But, as has been stressed by Mr Dammers and other speakers, there are consequent changes in one's organizational services that are also going to affect costs. He has mentioned the effect on loans; since users are being told about more literature, this is leading to more demand for this literature to be available; and in fact, as information officers/librarians, we must not forget the importance of document back-up—it is no good piling up references unless there is also ready access to documents.

There are other aspects of the effect on services: if one is going to rely upon references coming from the tape services, then maybe one's own local indexing and abstracting and bulletin production is going to be affected; and especially with regard to abstracting (which is a very expensive operation in library information service) this may affect the economics of one's operation quite considerably. One's subscriptions to journals and to printed abstracts journals may also be affected.

So the costing side of the cost–benefit situation is far from simple: it can be quite a complex business to size up what has happened to one's costs as a result of a decision to make increased use of external tape services. The benefits ultimately are what the user receives—the ultimate user, the final user of the information. The convenience of having something brought to his desk regularly, rather than having to go looking for it, has been mentioned as a benefit. In fact, accessibility of information, as we have found in many studies, is perhaps the most valued feature of an information service in general. Another benefit is the time that may be saved—and here we must distinguish carefully between time saved in searching for something to read, and time saved in actually reading it, because no bibliographical reference service is going to save time in reading, only save time in searching for information. I think this is relevant to a point that has been made—or at least a point that has been disputed—as to whether precision is important or not. Clearly, to find only one good reference in a hundred every week, while the rest is irrelevant, will not be appreciated by the user. But on the other hand, many people, particularly those of a more speculative type of mind, are not averse to having a wide selection put before them every week, even if they only pick two or three items out of it for actual follow-up. They like to see what is going on in a fairly wide field. So preconceived ideas of aiming at some particular precision is not necessarily the right approach; we must in fact always come back to the individual user's need, and how to use tape services and any other kind of service to give him what he needs.

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

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P. A. THOMAS

This publication reports the third stage of an Aslib Research Project on the use of bibliographic records, the first two stages having been reported in Occasional Publications 3 and 4. These earlier reports analysed the procedures found in library housekeeping routines, and in studying the actual use of individual elements of information, a further level below that of activity was recognized—the 'task' level. This is made up of a set of tasks which accomplish an activity within one of the eighteen procedures common to the different types of library visited during the study.

The set of tasks adopted is reported here, and their use and validity demonstrated by a detailed task analysis of processes in an actual library. The technique developed may be applicable to the analysis and design of a system using machine-readable bibliographic records.

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G. CHANDLER

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incorporating Aslib Information

Volume 23 November 1971 Number 11

ASLIB CALENDAR 1971–72

December

WED.1.	Engineering Group evening meeting. Speaker: Mrs Rena Knight (CIRIA). Aslib.
THU.2.	Computer/Data Processing Group evening meeting: 'Some services offered by computer libraries and information units'. Aslib. 5.30 p.m.
MON.6.	Co-ordinate Indexing Group meeting: 'Terminology of co-ordinate indexing: a discussion'. Aslib. 3.30 p.m.
WED.8.	Midlands Branch Film Night. BIP Chemicals Ltd, Oldbury.
	Economic and Business Information Group visit to DTI, Victoria St, SW1. 2.30 p.m.
MON.13.	Social Sciences Group evening meeting: 'The SSRC project', by J. E. Pemberton (Warwick University). Aslib. 5 for 5.30 pm..
WED.15.	Aslib Christmas Party. Aslib. 5.30 p.m.
FRI.17..	Scottish Branch Christmas Party and meeting. Speaker: Professor W. E. Tyler.

January 1972

WED.12.	Aslib evening meeting: 'Library Management Research at Cambridge', by J. L. Schofield. Royal Institution of Naval Architects. 5 for 5.30 p.m.
TUE.18.	Midlands Branch (with Institute of Information Scientists) evening meeting: 'Systems analysis and its application to library and information work', by H. East. Aslib.

New members

CORPORATE

(specialized Group interests are given after names, where relevant)

Name	*Locality*	*Representative*
BP Chemicals International	Port Talbot	G. F. Batty
Bellard Information Systems	London	D. S. Flook
Campaign (*Econ*)	London	Miss G. Clegg
Cole, R. N. Ltd (*Chem, Eltron, Eng*)	Croydon	Miss A. Hanson
Computer Information Centre	London	D. Shirley
Cory, Wm & Sons (*TTG*)	London	R. Stewart
Cybernet Research Consultants (*AVG, Bio, Chem, CIG, Econ, Eltron, Eng, SSG, TTG*)	London	B. Skinner
European Bibliographical Centre (*CIG, SSG*)	Oxford	D. Reaney
Foyles Library Supply Division	London	C. Foyle
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Parsons Brown (*Chem, Econ, Eng, TTG*)	Bristol	R. Day
Pritchard Rhodes Ltd (*Chem, Eng*)	London	Mrs E. Wade
Transletta Translation Bureau (*Eng, TTG*)	Bedford	Miss P. Train
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Civil Service College (*AVG, CIG, Econ, SSG*)	Sunningdale	Miss E. May
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Metropolitan Police Library (*SSG, Econ*)	London	D. Streatfield
White Fish Authority (*Bio, CIG, Econ, Eltron, Eng, TTG*)	London	T. Sealy
Instituto de Pesquisas Technologicas	Sao Paolo, Brazil	Miss O. Fonseca
Senai DR–GB (*AVG, CIG, Econ, Eltron, Eng, SSG, TTG*)	Rio de Janeiro, Brazil	Miss H. Figueiredo
Library of Parliament	Ottawa, Canada	E. Spicer
Malmstrom A/S	Copenhagen, Denmark	R. Colquhoun
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Technical University (*Chem, CIG, Eltron, SSG*)	Twente, Netherlands	G. Hamel
Ebsco Subscription Service (*Chem*)	Birmingham, Ala.	J. Stephens
Brodarski Institut	Zagreb, Yugoslavia	P. Milat

INDIVIDUALS

M. T. Banerjee (*Eltron*)
M. E. Corbett (*TTG*)
Miss S. Garrett (*Bio*)
G. B. Hart
J. P. L. Hamstra
J. C. Preddle
A. J. Wade (*SSG*)
G. K. Walker
Mrs V. C. Wiles (*SSG*)

Aslib 46th Annual Conference, Ranmoor House, University of Sheffield, 24th–27th September 1972

With limited resources librarians and information officers have always had to decide how these resources should be allocated between the internal creation of searching tools and dissemination systems based on primary material, and the purchase of external bibliographical, abstracting and current awareness services. A new dimension has been added to this problem by the growth of computer-based services offering selective dissemination and searching facilities in the form of either printed output or magnetic tape, or both; and it is likely that increasing use will be made of these services.

Nevertheless, the problems of designing local information systems in which the additional expenditure on external services is balanced by some reduction in local effort, while maintaining, or increasing, the overall effectiveness of the service, are very great and are both technical and organizational.

The 1972 Annual Conference will provide an opportunity to consider the role of external information services of all kinds (not only computer-based systems) in relation to the work of the local information unit and library. This will be supplemented by an exhibition of commercially available information services (computerized and otherwise), which will be on view in Ranmoor House for the duration of the Conference.

Speakers at Sheffield will take a searching look at the basic needs of an information service, the systems that exist and the criteria for evaluating them; and the organization and economics of using external services for SDI and retrospective searching. This will be illustrated by case histories, from which discussion will arise and it is hoped valuable lessons will be drawn. Manpower implications and the kind of information worker who will be needed in this different kind of activity will also be discussed and it is hoped that a final session may draw together the threads of the argument with some suggestions to the external services as to how they might adapt to meet their users' needs.

The users' view at Sheffield

The 1972 Annual Conference (as described above) will look at external information services of all kinds in relation to the work of local information units and libraries and very much from the point of view of the users—actual and potential—of these services. For this reason, the case histories of the use—or rejection—of such services that will be presented in the session at 9.30 a.m. on Tuesday, 26th September, are likely to be a particularly interesting feature of the programme and to ensure that they are as widely representative as possible, the Conference Committee are inviting contributions from the membership on this subject.

The session will consist of three case histories, of not more than 20 minutes in duration, and members who would like to contribute are asked to approach the Conference Organizer, Aslib (3 Belgrave Square, London SW1X 8PL) as soon as possible with a draft text, which will be considered by the 1972 Annual Conference Committee.

Unfortunately, time will only allow the inclusion of three such case histories, but the programme will provide ample scope for the discussion of the problems and advantages of external services, both with the speakers and other delegates as well as the purveyors of the services themselves, many of whom will be exhibiting throughout the Conference.

UK visit of Dr R. H. Orr

Dr Richard H. Orr, who has since 1958 been Executive Director and Director of the Institute for Advancement of Medical Communication, Philadelphia, is in this country for twelve months as a Senior Visiting Research Scientist. He will be based on Aslib Research and Development Department, sponsored by OSTI, and will survey UK library research and participate in research programmes and seminars. Dr Orr's studies in biomedical documentation and library management will be well known to many members of Aslib. His stay in this country will provide a valuable opportunity for the transfer of US research experience to UK librarians.

Aslib Seventh Annual Lecture, 1973

Aslib's seventh Annual Lecturer maintains the distinguished tradition of previous years. Basil Z. de Ferranti, a Director of Ferranti Limited and of International Computers Limited, has accepted an invitation to talk about the confrontation of human and computer intelligence, a subject to which he has given a great deal of thought. Under some such title as 'The brain sciences: the frontier of knowledge', he will look at the relationship of human and machine intelligence, at the views and activities of people working in the field and at the sources of information that are relevant to this area of knowledge. He hopes also to correct some of the misconceptions, both extravagant hopes and extravagant alarms, that beset this subject and chart out the creative possibilities it opens up.

Aslib Midlands Branch

The aim for the 1970–1 session, to provide a more active branch and to increase the number of meetings, has been achieved. During the last year, the committees of Aslib and Library Association Midlands Branches have been working closely together with the result that there are now representatives on each other's committees. With collaboration, a 'Film-Night' has been arranged for 1st December.

In November a joint meeting with the U.C. & R section of the Library Association, on a Government Publications paper, was presented, and the New Year will open with another joint meeting, when Mr Harry East from Aslib will give a talk to Aslib members and members of the Institute of Information Scientists on 'Systems analysis and its application to library and information work'.

The afternoon Workshop was such a success earlier this year that a repeat has been decided upon in February 1972. The speakers will be Mrs Mack (CEGB) on 'Forward planning as related to library and information activities'; Mrs J. Aitchison on 'The English Electric Thesaurofacet Classification System'; and Mr H. Goom on 'Impressions of the current American scene', gained from a recent visit to the USA.

The 21st Anniversary of the formation of the Aslib Midlands Branch will be the social event of the year in March 1972. It is proposed to have the Annual General Meeting followed by the celebration party, the form of which has not yet been decided. Further details will be available at a later date.

From the 4th–6th May 1972, the Joint Northern/Midlands Branch Conference will be held at the Derwentwater Hotel in the Lake District, the theme being 'Services to the information unit'. The speakers include the following. Mr G. P. Henderson (CBD Research), Mr D. St J. Thomas (David & Charles Publishers), Mr D. Urquhart (NLL Lending Services), Miss M. Webb (References Services of the British Museum Library), and Mr J. Sharp (ICI Plastics Division).

Finally, on 16th May a visit is being arranged to the Birmingham Post and Mail, to look at the organization of a newspaper library in relation to the work of the various departments, and the vital part it plays in the news media.

The Education Committee of the Branch will be organizing a one-day Course in late February or early March 1972, designed to assist librarians and information officers in the gathering, interpretation and presentation of financial and commercial information.

Two other events to be held will be:

'Fact-finding for Management', a one-day course organized jointly by Aslib Education Department and the Midlands Regional Office, to be held at the Engineering & Building Centre, Wednesday, 1st December 1971; The Engineering Group Conference, to be held at Dunchurch Industrial Staff College Rugby, 25th–27th February 1972, on 'Costing Library and Information Services'.

Further details concerning the meetings of Aslib's Midlands Branch can be obtained from Keith Wakelam or the secretary.

Survey of Road Research

The International Road Federation World Survey of Road Research is the title of an evening meeting of the Aslib Engineering Group, organized for Wednesday, 1st December. The survey was initiated in the USA because the then US Bureau of Public Roads had no properly retrievable records of the research it supported in many joint Highway Research projects. The survey was done by personal interview. This method has now been extended to over fifty countries in all parts of the world. Mrs R. Knight (of CIRIA), who has done 16 of these surveys, will talk about the method and some of her findings and experiences.

The meeting will commence at 6 p.m. (tea 5.30 p.m.) at Aslib. It is open to all Aslib members and those wishing to attend should contact Mr B. R. Styles, Chairman of Aslib Engineering Group, Room 012, c/o The Library, Department of the Environment, Lambeth Bridge House, London SE1.

University of Surrey seminar on circulation systems

The University Library has operated an ALS off-line circulation system since September 1970. OSTI has awarded £10,000 for research into a new on-line system using ALS equipment and a Digico Micro 16P computer.

A seminar will be held on 13th December at Guildford. This will be before the specification is frozen, in order that suggestions can be taken into account. Those interested should get in touch with R. F. Eatwell, University of Surrey, as soon as possible.

Coffee, lunch and tea cost approximately 70p. Overnight accommodation can be arranged at £2.00 bed and breakfast.

Membership of the Advisory Committee for Scientific and Technical Information

The Secretary of State for Education and Science has appointed Professor G. Black, Professor L. Maunder and Dr R. Weck CBE to the Advisory Committee for Scientific and Technical Information as from 1 October 1971.

The complete membership of the Committee for the next session will be: Dr L. Rotherham, CBE, FRS (Chairman); Dr J. W. Barrett, CBE; Professor G. Black; Mr J. G. N. Brown, CBE; Dr G. M. Dyson; Mr H. J. Habakkuk, FBA; Professor K. B. Jepson; Mr N. MacKenzie; Professor L. Maunder; Mr D. T. Richnell; Professor G. D. Sims, OBE; Dr R. Weck, CBE.

New Research at the National Reprographic Centre for Documentation

This Centre has recently been awarded an OSTI grant of up to £12,200 over 18 months to support a special programme of research in two subjects of increasing interest to information specialists. Firstly, the application of computer-output microfilm (COM) technique to information handling, evaluating the use already being made by libraries of locally produced COM catalogue material and also running a small pilot study in which COM catalogues will be installed in a small specialized library, their use monitored and users' reactions observed. Its report may take the form of a handbook for those wishing to use COM methods in information systems. Secondly, remote access to information where a variety of techniques is available for remotely selecting information from a store and having it transmitted to remote terminals. The Centre will investigate four areas; information bank, storage medium and selection mechanism, transmission system, and economics. Further details of these projects can be obtained from National Reprographic Centre for documentation, Hatfield Polytechnic, Endymion Road Annexe, Hatfield, Herts.

Cassette Television in Aberystwyth Public Library

Aberystwyth public library is the first to have installed an EVR teleplayer, supported by a series of educational programmes in cassette form. The teleplayer will be available for use within the library by the public who will be able to select and show cassettes of their choice. The teleplayer will be available also to local schools and colleges. The EVR system puts television under the control of the user so that chosen, prerecorded programmes can be played through an unmodified television set. Its stop frame capability allows frame by frame study where this is required. Its significance in education and training is immediate and its application in the consumer field cannot be ignored.

Data Bases in the Social and Behavioural Sciences

The University Graduate Division of the City University of New York has announced that its Center for the Advancement of Library-Information Science is compiling an international registry of *Data Bases in the Social and Behavioural sciences*. Professor Vivian S. Sessions, Director of the Center, will edit the results of a current survey of existing or planned data base operations, with publication scheduled for late 1971 by Science Associates/International, Inc., New York. This international effort is directed toward solving the problem of locating and accessing those files outside the immediate working environment of any one scientist. The publication will be updated on a periodic basis.

Those involved in relevant data enterprises should request an input form from: Professor Vivian S. Sessions, Center for the Advancement of Library-Information Science, City University Graduate Center.

The Fluidics Data Index

The purpose of the Fluidics Data Index (FDI) is to bridge the communications gap between suppliers of fluidic equipment and the industrial user. This is achieved by giving the latest information in an organized way on stiff standard 8 in. × 5 in. cards. Each card gives full details of a new commercial element, component, system or application. The information is obtained directly from the manufacturers on a world-wide basis and the cards are sent to all regular subscribers at bi-monthly intervals. Annual indexes and reference charts are also supplied as part of the subscription. Some 300 cards have so far been issued.

Subscription rates for 1972 are £6.00 in UK and £7.50 elsewhere. Airmail postage outside Europe £3.00 extra. A complete set of some 360 cards issued to the end of 1971 is available at £11.00 in UK and £14.00 elsewhere. Airmail postage £5.00 extra. Further information is available from: International Fluidics Services Ltd, Felmersham, Bedford.

People and Places

DR MARGARET ELIZABETH CHISHOLM has been appointed Dean of the School of Library and Information Services at the University of Maryland. Dr Chisholm has been with the school since 1969 as Associate Professor.

MR D. J. GROGAN, Head of the Department of Bibliographical Studies at the College of Librarianship Wales, has been invited to read a paper at a Joint Conference of the Malaysian Library Association and the Singapore Library Association. He has also been asked by the Government of Malaysia to remain as consultant, for a period of time. He is being sponsored by the British Council.

BRIEF REVIEWS

CAMBRIDGE UNIVERSITY LIBRARY. Classified list of current serials available in the University Library, 1971. 4th edition. Cambridge: CUL, 1971. 452 pp. £4.00 (ISBN 0 902205 02 1).

This volume is essentially a subject index to the titles of the Library's holdings in the main (alphabetical) list reviewed in *Aslib Proceedings*, vol. 23, no. 5. It is arranged by the Library's classification scheme and there is a good alphabetical index to the subjects. Details of holdings are shown only in the main volume.

The list excludes serials received by faculty or departmental libraries although it is hoped to include these in later editions when they have been classified according to the University Library's scheme. The gap of six months between the completion of the two lists, November 1970 and April 1971, means that new titles received between these dates appear only in the subject volume.

STANDING CONFERENCE OF NATIONAL AND UNIVERSITY LIBRARIES. Foreign theses in British Libraries. Compiled by R. S. Johnson. Cardiff: SCONUL, 1971. 27 pp. 25p (SBN 900210 00 1).

The information presented in this publication was collected by means of a questionnaire circulated to libraries in the late summer of 1968. It brings up-to-date and expands the relevant section of RECORD, P.D. *A survey of thesis literature in British libraries* (The Library Association, 1950).

The main section 'List of Universities' is arranged alphabetically by name of issuing university. Holdings of libraries are given where known. This is followed by the 'Index of Libraries', an alphabetical listing of locations, which indicates whether or not theses are available for loan and if facilities are available for making microfilm, microfiche or Xerox copies. It also shows whether or not the theses are catalogued and, if so, in what form.

FOREIGN TECHNICAL LITERATURE: A PROBLEM OF COSTS, COVERAGE AND COMPREHENSION

C. J. GOULD and B. T. STERN

The Wellcome Foundation Ltd, Beckenham

The broad results of surveys on the ways in which Wellcome scientists handle foreign language technical texts are discussed. Areas of co-operation between organizations leading to a reduction in costs and an increase in coverage are suggested with a view to Aslib acting as co-ordinator and arranging discussions between interested parties.

Introduction

DURING the past 2½ years the Wellcome Group Research Information Services have been measuring the extent of their foreign literature problem. Requests for translation into English emanating from all parts of the Group of Companies at home and overseas are sent to a central Translations Office at the Wellcome Research Laboratories, Beckenham. This Office handles requests for translation of published and unpublished technical material into English and provides scanning services and verbal summaries; translation of any material into foreign languages from English is dealt with by the Technical Translations Unit in London which is attached to the Marketing Division.

The centralization of translations within the information services has facilitated close analysis of the type of work received, costs, range of languages and subject matter. Recently surveys have been made on the translation of published material, initially to examine over given periods of time which are the most frequently translated journals, languages and subject fields, and secondly, to establish by questionnaire and contact (interviews and discussions) whether the services offered at present by the Translations Office could be usefully extended.

Although the Wellcome information scientists scan foreign journals, alert interested users to suitable articles and circulate full translations, it was nevertheless suspected that there is foreign literature of interest to staff that is being neglected. Any increase in the British scientist's ability to handle foreign languages has not kept pace with the increase in published literature.

Certain aspects of the Wellcome surveys coincided with previously published surveys. It is reasonable to suppose that the basic difficulties presented by foreign literature must occur in other technical organizations and that the closer the interests of the organizations concerned, the more similar the problems that face them. Wellcome believes that a group of companies faced with a common problem may be able to review the situation as it affects them and find some means of obtaining more translations of published literature at reduced costs on a joint basis.

Solutions and recommendations have been suggested over the last twenty years. Although many proposals have been considered worthy of further action very few have actually been implemented and, through lack of support, many have failed. More important still, many people seem to be unaware of the existing services which would help them to overcome the language barrier. Meanwhile technical published literature appears at an estimated minimum of 1–2 million articles, reports, patents and books per year,[1] 50 per cent of which are in languages other than English.

It would be premature to put forward concrete proposals at this stage as the exact nature of the problem must first be assessed. Wellcome has informally contacted other companies with similar interests. The degrees of interest expressed by these companies both in the problem and the findings of the surveys suggested others might also be interested. Accordingly, arrangements were made for the publication of the survey results and for Aslib to act as co-ordinator in any co-operative scheme that might develop.

TABLE 1: *All disciplines: Relative percentage of language translated*

58%	*16%*	*12%*	*10%*	*4%*
GERMAN	FRENCH SPANISH together	RUSSIAN ITALIAN together	POLISH CZECH JAPANESE SCANDINAVIAN PORTUGUESE together	MISCELLANEOUS GREEK FINNISH HEBREW together

TABLE 2: *Relative importance of foreign language to each discipline*

Clinical Medicine
1. German
2. Romance langs.
3. Scandinavian/Dutch
4. Japanese
5. Slavonic langs.
6. Miscellaneous

Chemical
1. German
2. Slavonic langs.
3. French
4. Dutch
5. Romance and Scandinavian langs.
6. Miscellaneous

Veterinary
1. Russian and German
2. Slavonic langs.
3. Romance langs.
4. Hungarian
5. Other European langs.
6. Miscellaneous

Biological
1. German
2. Russian and French
3. Slavonic and Spanish
4. European langs.
5. Miscellaneous

General (Administration) etc.
1. German
2. European langs.
3. All other langs.

Wellcome surveys: findings

Language and subject fields:

(a) Most translations were requested from current issues of foreign journals.

Back issue translations were requested in nearly every case by staff working on theses, dissertations etc.

58 per cent of the translations requests were for German to English for all subject disciplines (clinical medicine, veterinary medicine, chemistry, and biology) which was a far higher percentage than for any other language. In the veterinary field Spanish can be more important than Russian.

The figures in Tables 1 and 2 apply both to requests for translations from current issue journals and to back issues. The range of languages translated during the last twelve months is Bulgarian, Czech, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Polish, Portuguese, Rumanian, Russian, Serbo-Croat, Spanish, Swedish. The languages for fringe interest material vary from year to year.

(b)

TABLE 3: *Analysis of how the original foreign language reference was brought to the attention of the person requesting the translation (3 month duration)*

(a)	Current awareness bulletins	3 German, 1 French, 1 Portuguese.
(b)	List of references provided by Information Centre/Library in response to an enquiry made by you	NIL
(c)	Your own background reading	5 German, 3 French, 4 Spanish, 1 Russian, 1 Hungarian.
(d)	A Library search you made	20 German, 4 French, 1 Russian, 4 Italian, 3 Polish, 1 Serbo-Croat, 1 Czech, 1 Spanish.
(e)	Bibliography of an article you read	2 German, 2 Russian.
(f)	Via Society or Institute to which you belong	NIL
(g)	Colleague in country of publication	10 German, 1 Spanish, 2 French, 2 Dutch, 2 Italian, 1 Russian.
(h)	Some other means (specify) [sources not listed here]	9 German, 5 French, 1 Spanish, 1 Czech, 2 Italian, 2 Portuguese, 1 Russian.

Although the volume of translation requests during the 3-month period was much smaller than usual on account of the effects of the British postal strike, the ratios between languages is probably the same as in a 'normal' period.

(c) *The User Population*: About 10 per cent of the scientists at Beckenham have a language other than English as their mother tongue. Of the remainder 25 per cent profess to have reading ability in a language other than English. The extent of this reading ability and the languages concerned is the subject of further study. Scientists have been asked to suggest foreign journals that should be added to those already taken. Such suggestions can be made at any time but there is advantage in specifically asking when their attention has been drawn to foreign language problems. A long list of suggested titles was produced—some of interest to more than one group of workers. Some of the journals are now taken, circulated to the scientists on loan and scanned by the information scientists. The remainder require more discussion as to their specific value to individuals before action is taken and a method of coverage chosen.

It is clear from discussions that scientists cannot afford to wait for secondary publications such as *Chemical Abstracts* or *Biological Abstracts* to alert them to papers of interest. Whether or not they are aware of the contents beforehand, they will struggle laboriously through each issue of the journal concerned in order not to miss a paper it may or may not contain. The poorer the language ability of the scientist the costlier this practice to the Company in terms of time wasted by the scientist and any other scientist he may call on for help. Although adequate linguistic expertise is available from information departments, for purely geographic reasons the bench scientist is frequently unable to avail himself of this service. This problem is by no means confined to Wellcome.

Scientists need to browse through journals but unless the language barrier is reduced, this activity can be costly and is difficult to defend on the grounds of knowledge gained. It has been estimated that the average scientist spends one third of his time communicating[5] and since the volume of foreign scientific literature is constantly increasing this represents a considerable cost to an organization.

Some steps have already been taken towards improving the situation by holding German classes on site and it is hoped to reintroduce language classes in a slightly different format for German and Russian. The intention is not to turn the scientist into an expert linguist or translator but merely to give him the ability to comprehend a text, i.e. the ability to scan and abstract a foreign text as he now scans and abstracts one in English. The paper may still be submitted to the Translations Office for a full written translation if this is required.

In addition, to relieve the library loans volume regular borrowing of foreign journals for purposes of contents scanning may be replaced by circulating translated contents pages and/or translated summaries from selected journals. This project is being organized at the moment but will not include journal papers reported in English in *Current Contents*.

(d) *Cover-to-Cover Translation*: Wellcome have comprehensive figures relating to each journal from which translations have been carried out during a period of one year. It is unlikely that Wellcome would embark on cover-to-cover translation of any journal except possibly in collaboration with other companies.

There are a few journals, mainly German, where the likely cost of contribution to such a scheme could be less than the amount Wellcome currently spends on *ad hoc* translations from the same journals. Nevertheless, this is not sufficient justification for undertaking a cover-to-cover translation.

Although several authors are in favour of cover-to-cover translation for fringe interest journals[1,2,3,4,7,8] Wellcome incline to the view expressed by P. H. Scott[6] in that cover-to-cover translations are mainly justified for the provision of background reading of older material.

Possible collaborators in a cover-to-cover translation scheme are invited to contact Aslib so that possible journals to be translated, costs and feasibility may be discussed. The National Lending Library for Science and Technology (NLL) has been approached regarding such schemes and, although they wish to be kept informed, they are not in a position to be associated with such projects unless these are for Russian translation into English.

Methods of improving availability and/or reducing cost

One of the obvious sources of wasted effort is duplication, much of which could be avoided by closer co-operation (a) with existing agencies and (b) between companies working in similar subject fields.

(a) *Co-operation with existing agencies*

The two major agencies in the UK are Aslib and the NLL. Aslib maintains a location Index of translations into English (mainly journal articles and patents) and it is worth checking the Index before commissioning a translation. It is not necessary to be a member of Aslib to use this service. If the required translation is not located in the Index and the inquirer decides to commission one, a note is made in the Index so that any subsequent inquirer can be put in touch with the original requester, thus providing an opportunity to share the cost. If necessary, Aslib will act as an intermediary in obtaining copies of completed translations, thus ensuring the anonymity of the supplier.

The NLL maintains a collection of translations and organizations preparing translations are strongly advised to deposit copies with the NLL. The identity of depositors can be obliterated from the translation in order to preserve anonymity so that there can be no breach of company interest.[9] All translations received by the NLL appear in the *NLL Announcement Bulletin* and are notified to Aslib. In addition the NLL receives copies of all translations listed in the American *Translations Register Index* and for those concerned about learning quickly of translations of current articles an airmail subscription to this journal may be worthwhile, although it should be noted that entries from the *Translations Register Index* are included in the Aslib Index.

It would be advantageous for companies to use fully the facilities of these agencies. The cost to contributors is small and however few the number of translations notified by an individual company the likely benefits increase the greater the number of participants. Such participation is more valuable than the mutual exchange of lists of translations carried out by different companies; moreover, this exchange could raise problems of confidentiality.

(b) *Co-operation between companies*

Whatever the size and scope of a translations section, the range of language and the restrictions of the working week often impose the use of external translators (freelance, agency or staff linguists working in their own time). Clearly, in any particular subject field, the greater the volume of work directed towards a group of freelance translators or agencies, the greater are the opportunities to secure favourable rates and a higher standard of performance.

Aslib itself maintains a *Register of Specialist Translators* and will recommend to members suitable translators qualified in both the language and the subject field. Wellcome have themselves built up a useful panel of technical translators who, already well qualified in the various subject disciplines and as translators, are now conversant with the format, house style and particular preferences of

Wellcome scientists. The name of the requester of each translation is passed to the translator who is free to discuss the work with him by telephone or to pay a personal visit.

The contact system has been most successful in producing fringe benefits such as increasing the scientific knowledge of the translator and the linguistic appreciation of the scientists, thus promoting a mutual respect between scientist and translator which is so often absent and causes mistrust. Wellcome operate a similar system to that described by P. H. Scott where an approval form is submitted with each completed translation. The scientists' grading indicates that the standard of work has improved greatly since these arrangements came into operation.

To develop such a scheme to include several companies with similar interests for the translation of *published non-confidential papers* only, would have the advantage of reduced rates to all participants, a good panel of technical translators on hand and the provision of translations of high standard.

Other possible activities of a group of organizations co-operating in this field might include the following:

1. Liaison on the production of cover-to-cover translations.
2. Bringing about a closer evaluation of translations within the industry and within information services as an aid to measuring the real importance of foreign literature.
3. Improving the standards of scientific translation.
4. Production of glossaries of technical terms in various languages.
5. Persuading editors and publishers of foreign journals to include English summaries/abstracts where this is not done.
6. Title page translation.
7. Liaise with Aslib, Institute of Linguists and other bodies to sponsor courses in the administration of translations activities within organizations and to review the current demand for technical translation.

The next stage

Organizations who commission translations and who would be interested in discussions leading to a co-operative cost-sharing approach are invited to contact Mr L. J. Anthony, Assistant Director (Services) at Aslib.

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BASIC STRUCTURES FOR THESAURAL SYSTEMS

KEVIN P. JONES

Natural Rubber Producers' Research Association

Paper presented at the Co-ordinate Indexing Group Conference, University of Surrey, 15th–16th April, 1971

> The history of post-co-ordinate indexing is one of trial and error in the face of poor results . . . Most thesauri seem very arbitrary in word selection and the extent of classification is equally arbitrary.
>
> FARRADANE[1]

> The lack of semantic understanding, not even of a highly sophisticated level, by many otherwise thoughtful workers in information retrieval is distressing . . . It may be hoped that the somewhat mystical aura which has been spread around the use of thesauri in literature searching, whether on purpose or by misunderstandings, will be dispersed in order to make room for a sober and down-to-earth discussion of the issue.
>
> BAR-HILLEL[2]

IT WOULD not be difficult to assemble a set of similar statements, but in case any doubts remain about structural inadequacies, a brief examination of some (possibly atypical, but nevertheless present) entries from the EJC *Thesaurus*[3] may prove enlightening. *Monsoons* are cited as a category of *sea breeze*. *Sea breezes* are not accompanied by the analogous, and surely tactically more significant, *land breezes*. *Bombing* is accompanied by *dive bombing, night bombing, precision bombing, radar bombing* and nine other bombing types: theoretically, at least, it would be possible to have radar, precision, dive bombing at night: what then? Figure 1 shows how certain sections of the thesaurus fail to withstand graphical display and it is hoped that further comment is not required.

It is easy to assemble criticism of this sort: it is far more difficult to establish a set of basic rules to avoid the pitfalls. When a thesaural system was started at Natural Rubber Producers' Research Association (NRPRA) about six years ago, the advantages of faceted classification appeared obvious, in theory. In practice, the difficulties in elucidating a satisfactory set of primary categories appeared insuperable and an EJC type of structure was adopted,[4] which has worked well at an empirical level. Nevertheless, the advantages of a more coherent structure, in terms of synonym and other vocabulary control, continued to weigh heavily. At the same time the relative success of the existing system meant that any change had to lead to a significant improvement. This desired state has still to be found, but much has been learned that could, perhaps, be applied in an entirely new system. Therefore, this paper sets out to describe some avenues, which have been explored, rather than a Utopian thesaural structure, as it is felt that some of these approaches may be capable of producing a real return with the expenditure of more effort. Three types of structure are considered, which have been labelled: *inherent, macro-* and *micro*-structures. These will be identified with many other labels, like syntax and roles, but the use of new labels may avoid some of the emotive reactions which can follow from mentioning words like *role* too frequently.

Inherent structure extends to the order in the real world and man's interpretation of it. Most of us have insufficient time to elucidate structure directly from the former, and must be content with the interpretations of others. In certain subjects, notably the physical sciences, large sections of this inherent structure may be applied as unadulterated thesaural structure: an example from the EJC *Thesaurus* is clouds which follow the accepted meteorological classification: altostratus, cumulus, etc. It may be noted that many of these basic taxonomies are based on the ideas of space/time or scale. In a few cases, as in maps,[5] the information may be presented in a sufficiently formalized style for the thesaural stage to be omitted.

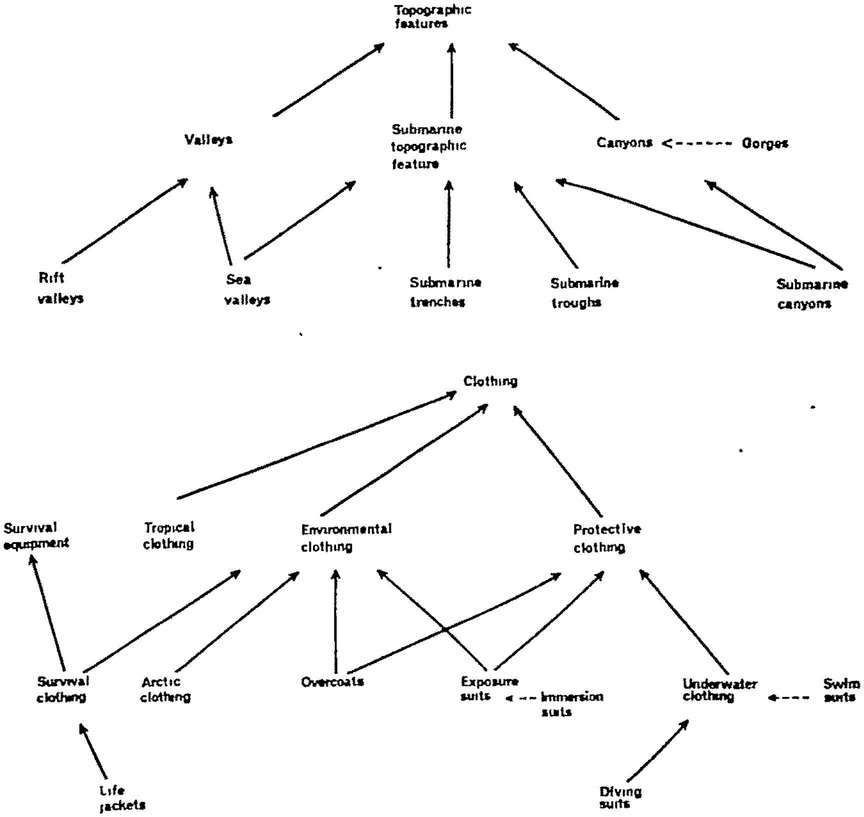

FIGURE 1: These arrowgraphs have been based on two hierarchal structures found in the EJC *Thesaurus*. The solid arrows indicate upwards generic linkages, while the dotted arrows lead from excluded words to preferred words. All 'refer to' connections have been removed in the interest of simplicity.

Some may feel that the inherent order of the physical sciences is lacking or unfathomable in technological topics. Nevertheless, through the agency of teaching, some order either emerges from, or is imposed upon, them. Table 1 shows an analysis made on the contents lists of several textbooks and manuals relating to rubber technology. It will be seen that most of them approach the topic in a similar manner; this corresponds with Bliss' notion[6] of scientific and educational consensus. It may be of interest to note that books published fifty years ago follow a markedly similar pattern—synthetic rubber being the only significant omission.

TABLE 1: *Contents comparison of major textbooks or manuals on rubber technology. (× indicates presence of a topic)*

	Books							
TOPICS	1	2	3	4	5	6	7	8
Natural rubber	×	×	×	×	×	×	×	×
Synthetic rubber	×	×	×	×	×	×	×	×
Compounding	×		×	×			×	×
Processing machinery	×	×	×		×		×	×
Vulcanization	×	×	×	×			×	×
Compounding ingredients	×	×	×	×		×	×	×
Testing	×	×	×	×	×	×	×	×
Products	×				×	×	×	×
Latex		×	×	×	×	×		
Ebonite			×	×	×	×	×	
Reclaimed rubber		×	×	×	×		×	×

Key

1 CRAIG, A. S. *Rubber Technology: A Basic Course.* Edinburgh: Oliver & Boyd, 1963.
2 MORTON, M. *ed. Introduction to Rubber Technology.* New York: Reinhold, 1969.
3 NAUNTON, W. J. S. *ed. The Applied Science of Rubber.* London: Edward Arnold, 1961.
4 DAVIS, C. C. *and* BLAKE, J. T. *eds. The Chemistry and Technology of Rubber.* New York: Reinhold, 1937.
5 LE BRAS, J. *Introduction to Rubber.* London: Maclaren, 1965.
6 *Progress of Rubber Technology*, 30, 1966.
7 *The Vanderbilt Rubber Handbook.* New York: R. T. Vanderbilt Co., 1968.
8 BLOW, C. M. *ed. Rubber Technology and Manufacture.* London: Butterworth, 1971.

The information gleaned in this manner has several applications in what may be termed the macro-structure of a thesaural system. Firstly, the limits of a subject area can be defined. Topics falling outside the main subject can be handled by variant vocabulary techniques. Thus, a but slightly modified form of natural language could be used for the main subject, whilst semantic factoring, or a general classification could be employed for topics lying outside. This philosophy will become increasingly important once Austin's general thesaurus becomes available.[7] The boundary also provides the means for introducing a role indicating whether a term is within, or without, the primary thesaural topic; for example, a thesaurus restricted to rubber technology could employ the roles *rubber* and *non rubber* as in *containers* [*rubber*]/*containers* [*non rubber*].[8] The main

TABLE 2: *Noun/adjective roots*

Root	*Noun*^{1}	*Noun*^{2}	*Noun*^{3}	*Adjective*^{4}	*Adjective*^{5}
Derived by/as	NOT	Adjective	+ic/+y	NOT	+ness
New form	–	–	Adjective	–	Noun
Conceptual notion	Entity	Material	Property [inherent]		Property [variable]

Examples		
	1. Tyre	4. Red
	2. Rubber	5. Redness
	3. Rubbery	

TABLE 3(*a*): *Verb root*

Active	+ ing	+ er + or	+ ent + ant
Neutral	root only + age + ion + ment		+ ivity + ability
Passive	+ ed + ate	+ ee	+ able + ible
Conceptual Notion	Action	Agent	Active property
	Indeterminate state		Variable property
	Terminal state	Patient	Inherent property

TABLE 3(*b*): *Examples*

mixing	mixer	
extruding	extruder	resistant
resisting	resistor	resistant
referring		
extrusion		extrudability
		resistability
referment		
mix		
extrudate		extrudable
resisted		resistable
referred	referee	

divisions identifiable by this technique might also be employed as the basis of roles or primary categories.

Roles and primary categories serve the same function: namely, a means for relating terms, keywords, descriptors or facets to each other. Thus, they are syntactic devices. They also enable the vocabulary to be divided into coherent and manageable units and may, therefore, be considered as 'slots'. Unfortunately, they *must* be mutually exclusive, which, as will be shown later, is an almost unattainable state. The interchangeability between roles and primary categories is clearly displayed in the American Petroleum Institute's thesaurus.[9] Many systems have been able to survive without this element of syntax, but it is becoming increasingly common, as is shown by *Thesaurofacet*[10] and the Brixton project.[11]

Macdonald[12] argues that roles are an inherent feature of the English language and should, in consequence, be based on sentence structure: that is on the relationships: subject, verb, direct and indirect objects, and complement. Unfortunately, whilst this may parallel roles like input and output, and be applicable as structure in machine-based systems,[13] it is difficult to see how it can bear on thesaurus construction as subject and object can be interchanged: John hit Bill/Bill hit John.

A more practical approach may lie through study of the various parts of speech, that is noun, verb and adjective, especially if consideration is given to both root form and the various forms derivable from it. Thus the noun-cum-adjective *capital* produces *capitalize* (a verb), *capitalism* (a noun), *capitalist* (a noun) and *capitalistic* (an adjective). Certain categories of noun are incapable of producing direct derivations: these are usually cited as entities or things and can be recognized by this characteristic. Thus, an apple is an entity because one cannot say *I apple* or *an applest thing*. Tables 2 and 3 illustrate this approach and it is evident that the verb is capable of transferring mood and tense to its derivatives.

If this line of thought is pursued, then homonyms (words outwardly identical, but having variant meanings) have to be differentiated: thus *a chair* (the things we sit on) and *to chair* (as in meetings) are homonyms. Care must be taken, however, not to confuse change in function with change in meaning. Words capable of functional shift can be categorized. Thus the concept of materials can be recognized by the fact that nouns representing materials can be applied as adjectives, without outward change: as in *rubber* and the *rubber tyre*; or *iron* and the *iron bedstead*. Similar shifts can take place between nouns and verbs as in *tour* and *rain*: a conceptual grouping for this particular phenomenon has not been found.

This approach has a parallel in some work published by Mandersloot *et al.*[14] There is, however, a fundamental difference: one system starts from word structure, whereas the other appears to have been based on philosophical preconceptions. Nevertheless, both equate with some of Soergel's role categories:[15]

Space/time
Whole/part
Class/element
Thing (entity type)
Property–type
Condition–type
Process–type
Agent–type
Target–type
Causality
Real/mental

but as will be shown, indirectly, some of these are semantic relationships, and, therefore, not strictly roles. Fairthorne[16] has rightly declared that these relations must be independent of meaning. Assessments based solely on the morphology of words would seem to meet this criterion.

The potent nature of the verb will be noted: it appears in virtually all role systems, paralleling its pivotal function in the sentence. At NRPRA it has been observed that few searches can be conducted without the presence of a verb-derived form. The main exception appears to be searches for bibliographies: a dead form of information. The peculiar behaviour of verbs will again be observed within micro-structure.

It must be emphasized that this approach describes exploratory work. Many suffixes remain to be examined: indeed, it is difficult to find a complete set to examine—Earl's set[17] used in machine analysis is far from complete. Further, the conceptual notions allotted to the word forms are highly tentative and it is possible that use of word endings would be more appropriate, e.g. a verb+ing category, rather than the emotive 'Action'.

Prepositional relationships form a bridge between syntax and semantics. They are capable of both relating words and influencing the overall meaning as in: in the garden, near the garden, and so on. Further, they lack mutual exclusivity: this can be illustrated by the behaviour of *at* which can related to both space and time as in: 'I will meet you *at* six', or 'I will meet you *at* the library'. Coates has applied a set of prepositional relationships[18] to the structure of *British Technology Index*. Other work[19] has studied the use of prepositional relationships in the titles of scientific papers in connection with automatic indexing. In theory, at least, it should be possible to use prepositions directly as indexing units. At worst they would have a neutral effect on system performance; at best they might act as precision devices.

Many compound words evolve from prepositionally linked phrases.[20] Thus *cow shed* probably derives from a *shed* for *cows*; a *lighthouse* from a *house* with *a light*, and a *liner train* from a train like a *liner*. Some prepositions seem to lead to strongly bound compounds, others appear to have more limited binding powers. Thus, it is not difficult to imagine the *shed for cows*, the *cows' shed* and *cow shed* appearing within the same context, but a phrase analogous to 'that train like a liner just went by' is extremely unlikely. Further, in *cow shed* both components retain their original meaning but in *liner train*, the *train* part retains its meaning whilst the *liner* part loses it: liner trains have absolutely nothing to do with ships as such. By extension, there is probably a strong case for examining phrases containing prepositions like *like* and *with* to consider whether the words related have some special relationships requiring pre-coordination. Other compounds in the process of derivation from phrases appear to lose some key element as in *washing machine* (a machine for washing clothes) or *seaplane* (a plane which lands/takes off from the sea). These structural elements can form the basis for fracturing decisions. Compounds with components falling into more than one of the main role categories may, in some cases, be fractured on this basis: e.g. rubber tyres—rubber is a noun acting as an adjective (therefore, a material)—tyres are entities. Perverse usage, common in technologies, can affect fracturing decisions: if cow sheds are used as laboratories, then *cow sheds* should retain the compound form.

We have now sunk almost to the lowest level: namely to micro-structure, or the study of meaning, hopefully, in individual words. Before expending effort in this direction, it is necessary to see whether others may have done the job for us, in the shape of lexical studies. An examination of the scatter in Table 4 (a comparison of definitions for rubber) would seem to indicate much activity, but little consensus. Perhaps rubber, as a word, is too difficult to analysis lexically. If this is so, what are the chances of finding adequate definitions for all the words likely to be found in a thesaurus limited to rubber, its properties, treatment and applications?

Meaning has many meanings (Cherry[21] gives a good readable introduction on this topic). Most attention has been paid to inter-relationships of meaning between individual words, phrases or sentences and less attention has been paid to the possibilities of relating words directly to the thing referred to. Exceptions to this are the pictorial matter contained in *Webster's Dictionary*[22] and the pictographs in CI/SfB.[23] Pictorial representation is a powerful device: this is illustrated by the vast amount of information which can be conveyed through maps, but is not applicable to concepts like action or properties.

Most semanticists insist that words can only be judged to have meaning in context.[24] At first, post-coordinate indexing would appear to be context-free, but this is not so, as the thesaural relationships should provide a context, especially if these are thoroughly applied. The words which characterize the meaning of an individual word are known as collocates[25] and must not be confused with synonyms. Collocation merely implies that certain words tend to co-occur within a text. Accelerators, crosslinking, sulphur, curing, and perhaps time and temperature, tend to be collocates in literature on the vulcanization of rubber. Many of the 'refer to' references in the EJC *Thesaurus* are based on collocation. Much of the work at the Cambridge Language Research Unit has studied this phenomenon.[26] Unfortunately, it is extremely difficult to see how collocation can be approached systematically without the aid of whole-text computer searching. Nevertheless, there would seem to be a strong implication that *no* thesaural term should be displayed without some form of lexical definition or structural linkage.

The following semantic categories have been identified by Lyons:[27]

synonymy
hyponymy (or the inclusion relationship)
incompatibility
antonymy
complementarity
converseness

TABLE 4: *Rubber: definitions*

KEYWORDS PRESENT IN DEFINITION	NOTIONS CONTAINED IN DEFINITION	*Bibliographical sources*										
		1	2	3	4	5	6	7	8	9	10	10^1
Elastomer		×				×	×					
Polymer or macromolecule			×	×			×					
Recovery [from deformation]			×		×	×				×		
Swelling					×			×				
	Chemical structure							×				
	Origin	×					×			×		×
	History								×			
Eraser									×	×		×
Vulcanization		×		×				×	×			
	Uses			×				×		×		
Synthetic							×			×		
	Homonyms: e.g. bridge [game]									×	×	

× indicates the presence of the keywords listed on the left of the table.

Key to bibliographical sources

1 AMERICAN SOCIETY FOR TESTING MATERIALS. *Glossary of terms relating to rubber and rubber-like materials*. Philadelphia: ASTM, 1956. (ASTM Special Technical Publication, No. 184.)
2 BRITISH STANDARDS INSTITUTION. *Glossary of terms used in the rubber industry*. London: BSI, 1968. (BS 3558.)
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9 *Webster's seventh new collegiate dictionary*. Springfield (Mass.). Merriam, 1967.
10 *Concise Oxford dictionary of current English*, 5th ed. Oxford: Clarendon Press, 1964.
10^1 *Ibid.*, but the entry considered is 'india-rubber', which is subsumed under 'India'.

plus the notion of componential analysis which is akin to semantic factoring. With the exception of the first and last named, Karen Spark Jones[28] has rejected most of the above as either not genuine or not definable within the confines of linguistics. Nevertheless, from the point of view of information work, some of Lyons' relationships are capable of providing a great deal of illumination.

Lyons has stated that two or more items are synonymous, if the sentences which result from the substitution of one item for the other have the same meaning. This, in terms of information work, appears attractive as referential considerations are ignored (one does not need to go to the zoo to check for synonyms, if any, for elephants) and the system appears testable. However, there is a penalty in that context dependence permits a degree of shift in meaning of individual words; for example, if in 'John removed the car, John stole the car, and John borrowed the car' one assumes that John and the car are the same, then *removed, stole* and *borrowed* may be judged as synonymous—they probably are to John, but clearly not to the owner of the car! This method probably has practical applications in information work but shift of meaning will always remain a danger. Ullman's statement[29] that total synonymy is extremely rare: 'a luxury which language can ill afford', offers an alternative approach. Unfortunately whilst this could hold for nouns, there would seem to be a natural overlap between verbs as in *standing, creeping, ambling, walking, trotting, running, leaping*. Where does one distinguish *trotting* from *running*? Clearly one could bunch them all together as moving, but this only transfers the problem to a higher level (Figure 2). Further, many so-called hierarchies of verbs consist not of verbs as such, but of strings of noun+verbs, as in the bombing example quoted earlier.

Hyponymy is perhaps Lyons' most interesting relationship. It is analogous to logical inclusion and can be illustrated by the example: the tulip is a flower: the flower is a plant. This type of relationship seems to correspond with the least debatable form of generic linkage, namely species→genus. Clearly it enables a strong distinction to be drawn between hierarchal linkage and the whole–part relationship with which it is often confused in thesaural systems. Clearly an engine is part of a car, but one cannot state (without producing nonsense) that an engine is a car. There is also a case for using this relationship to show up synonymy: if A is $B=B$ is A: then clearly A and B are luxuriant synonyms. Lyons also notes, as is often evident in information work, that hyponyms do not exist for all words. There is probably a case for limiting generic linkage by this technique: if a word for a higher level concept does not exist, it is unlikely to be sought at the retrieval stage as the concept is unlikely to find expression. Hyponyms are relatively rare for verbs.

Most of Lyons' remaining relationships hinge on the concept of analogous or converse relationships: e.g. husband/wife; good/bad; married/divorced. We need only to take one decision: namely to have both or to make do with one half of the relationship.

Componential analysis is akin to semantic factoring and the technological forecasting technique of morphological analysis,[30] as ultimate structural levels are explored: all three techniques share some of the mystique of sub-atomic physics. Restricting our attention to this linguistic microcosm, man can be analysed as (male) × (adult human) with woman as (female) × (adult human). It may be tempting to leap onto a semantic factoring bandwagon because of this linguistic parallel, but most linguistic studies have been based on colour (itself based on continuum logic) or on kinship (based on tree logic).[31] Hence there seems to be some circularity in the topic. Further it assumes that mutual exclusivity is attainable at this level and, as with the earlier basically binary decisions, no allowance is made for abnormality. Sharp[32] produced a Venn diagram for so-called mutually exclusive categories, like male/female, living/dead, just when these fundamentals were being questioned: When does death take place? Where are those Soviet amazons who disappeared from the Olympic scene?

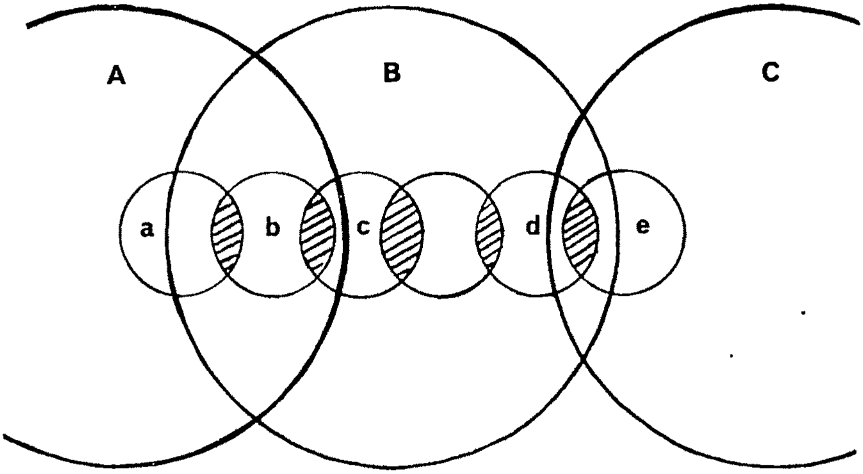

FIGURE 2: This diagram shows the complex effects of overlap in verbs, especially if higher generic substitution is adopted. This may be illustrated by reference to the EJC *Thesaurus*: the letters in brackets indicate the relevant modified Euler circles for the example in question:

(i) Coring [b]
  BT Boring [A]
  BT Drilling [B]
(ii) Quarrying [d]
  BT Surface mining [B]
Coal mining [c]
Open pit mining [e]
  BT Surface mining [B]

This does not exhaust the array of structural problems. There are acronyms, singular/plural forms, prefixes and new word generation. The first two form dichotomies and are, therefore, easy to resolve. Bloomfield[33] favours the singular form, following *Webster's Dictionary*,[22] whilst Kochen and Tagliacozzo[34] favour the plural. Clearly one or the other, but not an *ad hoc* mixture should be adopted. Acronyms save writing effort at the indexing stage, but could cause confusion where overlap occurs. Kochen and Tagliacozzo favour the full form but confuse acronyms with portmanteau words: e.g. motel = motor + hotel (or does it?). Prefixes are legion in number and their effect on meaning is quite extensive as in pre-coordinate, un-coordinate, de-coordinate and so on. Unfortunately, their use may be inconsistent as in negation[35] and difficulties may be encountered using them, as in the way that Blagden[36] fractured chemical names at the Zinc & Lead Development Association, e.g. Di+Sulphides.

Probably the main criticism in many minds is that words rather than descrip tors, or other conceptual notions have received emphasis. Unfortunately, individual conceptual decisions are bound to be subjective, and, therefore, unlikely to be generally applicable. At least words can, in theory, be approached objectively and they, inevitably, form the bulk of our raw material. Fairthorne,[37] in commenting upon Uniterms, stated that vocabulary analysis and semantic analysis of a document are equivalent, and that if this was not so, it would be impossible to gain information from books. The second criticism might be that classification and thesaurus construction share little in common. This misconception usually stems from a failure to appreciate that classification need not grow on trees or from confused notions about notation, which is an added complexity of many classifications and some thesauri that must inevitably hinder their expansion, but it is not an inherent feature. Pauline Atherton[38] has stated that classification consists of *any* method for creating relations, generic or otherwise, between individual semantic units.

This paper set out to explore a number of avenues, which in many cases turned out to be rutted cart-tracks. The fundamentals of classification, as Karen Spark Jones[39] has recently expounded, are extremely difficult to elucidate. In recapitulation, therefore, what types of structure do thesaural systems require?

1. A basic syntax capable of differentiating between various word functions [macro-structure].
2. A set of semantic relationships, capable of introducing structure by eliminating synonyms, by linking words generically and by differentiating between compound forms. These only serve to illustrate the inherent possibilities of the semantic approach. A great many other paths have been, or deserve to be, explored [micro-structure].
3. Lastly, a thorough appreciation of the structure which emerges from, or is imposed upon, a topic covered by a thesaurus is required. As far as possible, this should be compatible with the macro-structure of the system [inherent structure].

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DISCUSSION

MR J. L. JOLLEY (J. L. Jolley and Partners Limited) asked if thesauri are rather under-signposted? Some years ago he met a privately-made thesaurus whose constructor had used 'S/U' (sometimes use) and 'O/U' (occasionally use) as well as plain 'USE'. This dealt with varying degrees of synonymity.

MR JONES agreed with Mr Jolley that many thesauri were under-signposted and proceeded to describe several extensions to the normal categories which have been applied *experimentally* at NRPRA. These categories are listed below:

abbreviation	*meaning*	*converse*	*meaning*
PO	Post on	NT	Narrower term
BT	Back to	ST	Specific term
AT	Use	UF	Up from
AT	Use	IN	Includes
OR	Use A or B	UO	Up from [or]
CO	Co-extensive	CO	Co-extensive
CW	Combine with	RC	Refer to
RT	Refer to	RT	Refer to
EX	Excludes		
PW	Part/whole	WP	Whole/part

The distinction between 'post on' and 'back to' is that the former denotes compulsory upwards generic posting, whereas the latter merely notes hierarchal structure. AT covers all words which are eliminated from the system, but UF is intended to show synonymy whereas IN shows deliberate inclusion,

e.g. CURING	VULCANIZATION
AT VULCANIZATION	UF CURING
REJECTION	ACCEPTANCE
AT ACCEPTANCE	IN REJECTION

OR is an extension of AT: the word is excluded from the system, but two or more alternatives are offered, e.g.

EXTENDERS
OR FILLERS
OR SOFTENERS

CO indicates that two or more words markedly overlap in meaning, e.g.

PENETRATION
CO IMPREGNATION

CW indicates that if A is used then B or [B or C or D] should also be used, e.g.

CORDS [NON RUBBER]
CW BELTING
CW TYRES

EX is intended to show that the idea conveyed by one word, should exclude those ideas contained in closely related words, e.g.

RAPID TRANSIT SYSTEMS
EX MONORAILS
EX RAILWAYS

In other words the use of RAPID TRANSIT SYSTEMS should be restricted to those transport systems which are not railways or monorails. PW/WP (Part/whole, etc.) is limited to just that, e.g.

SIDEWALLS	TYRES
PW TYRES	WP SIDEWALLS

By this process, RT (refer to) should be restricted to the accidents of collocation and the PO/BT/NT group to pure species–genus relationships, thus providing clearer patterns of word-to-word associations.

MR A. G. A. PICKFORD (Medical Research Council) stated that Mr Jones had suggested that nouns should be standardized in the singular or in the plural forms within thesauri. Mr Pickford wondered whether this was really worthwhile and postulated that it would be better to settle for plurals in the case of things representing classes of things (e.g. metals) and singulars in the case of specific things (e.g. tungsten).

MR JONES replied that he had, on this occasion, been preaching what he did not practice and that he had tended to use whatever looked right. He had only brought up this topic because others thought that they had clearer ideas. Superficially, Mr Pickford's policy looked attractive, but unfortunately the distinction between classes of things and specific things depends upon one's position: in some systems metal may be specific, in others tungstens may represent a class.

MR PICKFORD queried whether there was a general set of rules for handling synonyms, or whether we must resign ourselves to recognizing that there is a spectrum of synonymy, and that individual judgements must be used to decide at what point something must be done about a particular partial synonym.

MR JONES replied that there appeared to be two approaches to synonymy: one was to judge (like Ullmann) that synonyms scarcely ever exist (this is basically the natural language approach) or to attempt to organize a witch-hunt for over-lapping words. If the latter course was followed, over-lap is found at every turn in verbs or words derived from verbs and is not uncommon in nouns: if decisions are made to group words together, the problem is enlarged as the area for overlap is increased [see Fig. 2]. The system at NRPRA had started with a rigidly restricted vocabulary, but indexing was found to be extremely difficult. After a time control was slackened and the vocabulary was allowed to grow: indexing became simpler (one eye did not have to be continuously checking a thesaurus) and searching improved in precision. When one set of feature cards was finished, consideration was given to adopting natural language (with a thesaurus as an aid to searching), but the thought of running two incompatible systems did not appeal. Nevertheless, in retrospect, this was probably a mistake and any entirely new system would almost certainly employ natural language with rules for handling compound words, etc. The cost of an enlarged set of feature cards (and the marginal extra cost for drilling) would be small compared with the greater indexing productivity. For the future, hope would seem to lie in further studies in linguistics, especially in lexis and collocation, but unless these studies can escape from the realm of *subjective* decisions it is doubtful if an improvement over natural language will be obtained.

GRAPHIC DISPLAY DEVICES IN THESAURUS CONSTRUCTION AND USE

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Paper presented at the Co-ordinate Indexing Group Conference, University of Surrey, 15th–16th April 1971

ONE OF the essential problems in scientific documentation is the establishment of relationships between:

–the *author's* concepts and the free-language words which he uses to express those concepts;
–the *indexer's* concepts and the standard terms which he uses to represent them;
–the *querist's* concepts and the standard terms he will use to represent them.

These relationships are of three classes:

–*equivalence* (synonymy) and near-equivalence;
–*hierarchy* (specific–generic and part–whole relationships); and
–*co-ordination* (collocation).

In view of the difficulty of grouping the relationships between term couples into these three classes, there is a need for an additional class called '*relatedness*', which is in fact a combination of the three preceding ones.

Defining the types of relationship between term couples, and at the same time the meaning of the terms, was made much easier by the discovery that it is possible to represent the subject coverage of a term by a two-dimensional area in a 'semantic field' chart. The relationships can thus be defined in a very precise manner by the degree of congruence and overlap between the areas representing the terms.

Synonymous terms will obviously occupy the same area in the chart; hierarchies will be represented by the generic term area encompassing the area of the specific terms; 'related' terms will have overlapping areas; the areas corresponding to 'co-ordinated' terms with no semantic relationships between them will not touch at all.

The representation of a set of related terms in a semantic field was first shown in my paper to the FID/CR Study Conference at Elsinore.[2] It described the transformation of so-called Euler circles, representing the natural-language meaning of the words, into the terminology charts wherein concepts are defined by the limits of polygonal domains.

Starting with this representation, several types of display have evolved separately. First, the terminology charts developed by Euratom for the subject field of nuclear energy were simplified by the process of selecting preferred terms or keywords, thus yielding the so-called Arrowgraphs (*Euratom Thesaurus*, 1st ed.).

These were used in the European Nuclear Documentation System (ENDS) up to 1966 when they were superseded, at the request of the Euratom indexers, by terminology charts containing not only the preferred, but all indexing terms of some importance (*Euratom Thesaurus,* 2nd ed.).

These charts were revised and completed in 1969/70, at the request of the International Atomic Energy Agency, and published under the name of *INIS Thesaurus* (IAEA-INIS-13 A), for use by the 102 IAEA member countries in their contribution to the International Nuclear Information System (INIS) input.

Another line of development to have achieved international recognition is the 'coded grid' terminology display derived from the arrowgraph concept by Marcel Van Dijk. His first realization was a tri-lingual thesaurus for the International Road Research Documentation of OECD.

These charts are subdivided into one hundred numbered boxes, so that every descriptor can be located easily by the numerical code corresponding to its location in a chart and a box.

Van Dijk developed thesauri of this type for the Institut Europeén d'Administration des Affaires (INSEAD) and for the Caisse Nationale de Credit Agricole (CNCA). He is at present building a large thesaurus covering all the activities of Electricité de France.

In 1968 he developed a set of charts for INDATA (London); they are used in the elaboration of user profiles in an SDI system covering electronic components. Van Dijk generally supplements the set of charts covering a subject field with a 'macro-chart' which illustrates the relationships between the individual charts and repeats only the most important descriptors. The Bureau de Recherche Géologique et Minière (BRGM), Orleans, has also developed a thesaurus of this type.

The Circular Thesaurus of the Technical Documentation Centre (TDCK) of the Dutch Army constitutes a third line of development derived from the arrowgraph concept. Terms on different levels of specificity were arranged in concentric circles around the central concept of the chart. Whereas the Circular Thesaurus was developed for use in a manually operated documentation system, Van Dijk's thesauri were aimed at later computer implementation.

BIOSIS, the Biosciences Information Service of *Biological Abstracts,* recently developed a guideline for searching *BA* and *Bio-research Index,* which consists of circular charts displaying the scopes (not the descriptors) of a number of subject fields.

The *Euratom Thesaurus* (and the one being developed for Electricité de France), covering very large subject fields, was meant for use in a computerized system exclusively.

The same applies to the thesaurus published in 1971 by the European Communities for its Metallurgy Information System. The thesaurus is of the Euratom type and includes thirty-nine charts, at present in three, later in five languages (English–French–German–Italian–Dutch). The construction of the English version of this thesaurus was described in detail in a paper entitled 'Compilation of thesauri for use in computer systems'.[3] Contrary to what might have been expected, the constitution of a computerized term file and the printout of an alphabetized list of terms and relationships were started only after the graphic display charts had been given their final form, after a number of revisions. The graphic, not the alphabetic, display is the basic version of this thesaurus. This procedure has one immediate advantage over the classical which involves the management of a manual file of term cards and requires a tremendous amount of manpower, both expert and clerical, for cross-referencing and checking. It is quicker and cheaper, in terms of manpower and money, by a factor of between five and ten.

The transfer of terms from the terminology charts into a computer file is a very simple routine; the terms are transcribed on formsheets with letter codes for language version, term status and type of relationship; the computer digests this information and produces alphabetic term lists in various presentations. Inconsistencies in the term display, such as reference loops (A add B, B use A), are detected at the same time.

The same procedure is used for updating, i.e. adding new terms or introducing modifications into the thesaurus: the graphic display shows exactly which modifications of the existing relationships introduction of a new term entails, and the programme detects any inconsistences that many have been introduced.

It is recommended to write in any modifications to the charts in colour until they are made official by the next thesaurus revision.

Guillot[4] has described the use of alphabetic term lists and graphic display charts for indexing. He analysed the way of thinking of the indexer while he turns the pages of the alphabetic thesaurus and while he follows the arrows in a chart, and came to the conclusion that the indexer using a chart will necessarily produce a set of indexing terms more complete than the indexer using a term list, in a shorter time. His experience shows that the use of graphic display also noticeably increases the consistency of indexing.

This illustrates the main advantage of graphic display: the user can take in at a glance *all* the semantic relationships of a given term, without going through the page-turning and note-taking involved in consulting a term list.

While it is important for good *indexing* to find *the most specific term* applying to a concept in a document, it is absolutely essential for good *retrieval* to find *all* the terms which could have been used to index relevant documents.

Terminology charts constitute a valuable tool for this purpose because all the pertinent terms are easily found; experience shows, on the other hand, that the documentalist using an alphabetical term list generally gives up long before he has found all the pertinent terms.

To sum up: graphic display leads to better use of the intellectual effort devoted to indexing and query formulation, and therefore to noticeably better cost-effectiveness of these operations.

This paper would not be complete if I did not mention one disadvantage of today's graphic display schemes: it is their representation (or misrepresentation) of multiple references of the three types:

A *use* B *and* C   A *add* B *and* C   A *see* B *or* C

In all three cases A is represented under B and under C in the corresponding graphs, in different founts to indicate the type of relationship existing between them. But no mention is made in chart B of the additional reference from A to C, and no mention is made in chart C to the additional reference to B. Indications of this type would encumber the charts. An acceptable solution would be to tag term A with an asterisk referring the user to a list of multiple references which could be either cumulative or separate for each chart.

Computer implementation of graphic term displays does not seem feasible at first sight. This may be the reason why many systems designers do not even take into consideration the alternative of using graphic display in the construction of their thesauri. It is not a valid reason, though, for term graphs are an excellent complement, for manual use by indexers, retrievers and thesaurus 'managers', to computer-assisted retrieval systems.

The latest development in computer use in information storage and retrieval is the on-line system for man-machine dialogue, which involves the use of a video display screen. Guillot[4] suggests displaying the 'coded grid' charts on the video screen as an aid to the documentalist, who could even point out the pertinent terms with a light pencil.

Another possibility is the presentation of the term blocks of the alphabetical term list; this would have to include the related terms shown on the displays and it would have to permit immediate passage to the term blocks corresponding to any of the broader, narrower or related terms displayed, thus speeding up the page-turning in the alphabetical list or replacing the visual wandering through an arrowgraph.

But a much more promising application is now being developed at the European Communities' information centre (CID). The CID has installed a computer terminal and is at present experimenting with an on-line retrieval programme.

At the same time, the traditional card file, which now holds 1.1 million abstracts, is being transferred onto microfiche. The microfiche display device, a CARD unit supplied by Image Systems (London) will be linked to the computer, in parallel with the terminal. The main purpose of the CARD unit is to allow rapid relevance decisions (and hard copy print) to be made on the basis of the abstracts displayed, after the retrieval operation. But before, while the documentalist is busy adjusting his query using the terminal keyboard and video screen, the terminology charts corresponding to the terms envisaged can be displayed on the CARD unit, thus giving a quick and complete survey of all the terms available in a given subject field.

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SOME PROBLEMS IN COMPILING A THESAURUS OF TRANSPORTATION AND PLANNING TERMS

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MY HISTORY MASTER always encouraged me to begin an essay with a quotation from some renowned literary source. Old habits died hard, so here is a quotation, related to the subject of planning and transportation in London:

> Your committee finds that the requirements of the existing traffic of the metropolis far exceed the present facilities provided for it; that the rapid increase of that traffic is constantly adding to the amount of inconvenience and loss thus caused . . . it has become indispensable to make provision in this respect for the future on a great and comprehensive scale, and with the least possible delay.[1]

These words of wisdom are not taken from any of the masses of documents which the GLDP Inquiry has generated, nor indeed is it taken from any postwar planning publication. This bold statement was in fact written before the invention of the motor car and can be found in the pages of the Report of the Select Committee on Metropolitan Communications of 1855.

Planners make many pronouncements, estimates and forecasts of future trends. These ideas are embodied in plans and statements but unforeseen eventualities always seem to make these plans outdated before they come to fruition. Who knows what technological advance may make motorways as redundant as this country's railway and canal systems?

With these thoughts in mind it may not surprise you that, although we have been planning a thesaurus of planning and transportation terms for some time, we do not as yet have a published work and are not likely to have for some time yet. One reason for this is that the Planning and Transportation Library is not yet two years old and other matters have had greater priority. The department was formed by the amalgamation of the former Highways and Traffic Department and the Planning Department. To these two was added the Research and Intelligence Unit of the Director General's Department. Each of these departments gave documents to the library, many of them inherited from LCC days, which had to be catalogued and otherwise organized in some way.

Initially it was thought that we might well be able to do without a thesaurus. Retrieval of information was to be based on UDC for books and pamphlets, with IBM's Document Processing System (DPS) dealing with the ever growing research documentation. It soon became clear, however, that we would require some form of vocabulary control which could best be achieved through the construction of a thesaurus. Before proceeding to discuss thesaurus construction however, it may prove useful to look at some of the areas where vocabulary control was thought to be necessary.

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* The opinions expressed in this paper are those of the author and are not necessarily those of the Greater London Council.

One of our major disseminating media is the *Daily Intelligence Bulletin* (*DIB*). Each morning the daily and London evening papers are scanned for items dealing with matters that concern planning and transportation with particular reference to the Greater London Area. Brief abstracts of the items are written and sent for typing before eleven in the morning. By mid-afternoon the duplicated bulletin has been distributed around the department. This saves planners and others a considerable amount of time each day since they no longer have to spend an hour or so reading newspapers. Photocopies of the cuttings are prepared and filed should anybody require to read the complete report, as frequently happens. The demand for photocopies is monitored so that we can see the areas of major interest and adjust entries in future editions of the bulletin. In order to assist our readers in their daily scanning of the bulletin a subject heading is attached to each item. These are generally limited to one or two words and are broad in concept. Thus an item dealing, say, with noxious emissions by diesel engines will be given the simple heading of 'Pollution'. Any improvement schemes in London which are reported on are generally entered under 'Redevelopment'. This rather arbitrary system works well until a retrospective search is required using the *DIB*. For this purpose the slips used for writing the abstracts are filed in alphabetical order by heading. In doing this we have found many inconsistences in assigning headings due to the fact that the vocabulary was uncontrolled. So for the City of London's Barbican Plan we find the headings 'Barbican Site', 'Barbican Flats' and also the simple heading 'Barbican'. Moreover, although the general term 'redevelopment' may be suitable for browsing, for a search over a year on a specific area like Barnsbury it is quite unsuitable unless subheadings are consistently used, e.g. Redevelopment–Barnsbury. Another problem which we may encounter is the result of attempting to group the abstracts under even broader headings such as Planning, Transportation, Economic Situation, etc. This would enable our readers who are not interested in all the areas covered by the bulletin to select sections for scanning. But this poses problems of classification. Will items on the siting of London's Third Airport be entered under the heading Planning or Transportation? For some time now it has become clear that these problems can only be solved by constructing a thesaurus perhaps using the terms which have already been used as headings in past issues of the bulletin.

But the *DIB* is not our only disseminating media which uses subject headings. *Planning and Transportation Abstracts* (*PTA*) is produced each month by the Research Library. Relevant articles taken from the library's journals are abstracted by the library staff and others and subject headings assigned before they are typed on a magnetic tape typewriter. They are typed on this machine since they are also put into our DPS system. Subject headings are added later in Letraset before each edition is run off. These headings, as with the *DIB*, tend to be general in concept. So an abstract of an article dealing with the possibility of running a vehicle on liquified petroleum gas in order to reduce exhaust emissions is assigned the heading 'Pollution'. Another abstract dealing with the construction of the new London Bridge is entered under the heading 'Bridges'. Problems arise, of course, when the abstract deals with a compound subject such as car parking and housing; population and planning; computers in local government, or even concrete bridges. We have adopted a system of references to deal with this type of problem, but here again if we are to maintain consistency we are going to have to provide ourselves with a thesaurus. It would seem rational that the thesaurus for the *DIB* should be the same as that for *PTA*.

Another disseminating document which we produce could well benefit by using the same thesaurus. This is the *New Publications* list which is produced monthly and covers books, pamphlets and some report material. This particular publication has passed through a number of stages during its evolution but we are now pretty satisfied with its present arrangement. Initially both books and pamphlets were classified and UDC order was the basis of the arrangement. But UDC did not produce a very helpful order for our readers when browsing through what is in effect a library new accessions list. Statisticians were particularly puzzled by the appearance of their subject at both 311 and also 519.2. At a later stage it was decided to abandon the classification of pamphlets, shelving them in files in accession number order and relying on a KWIC index for subject retrieval. So two or three editions of *New Publications* had a section devoted to books in UDC order with two further sections devoted to pamphlets and reports respectively, in an alphabetical arrangement by author. This we felt was most unhelpful particularly when for one reason and another we produced an edition which listed four or five pages of pamphlets. So the arrangement of *New Publications* is now similar to *PTA*, i.e. broad subject headings are used and no distinction is made between books and pamphlets. No attention is paid to UDC in the arrangement. Thus a book dealing with the computer handling of medical data can be entered under the heading 'Computers' as this is the major interest to our readers who will be statisticians and not medical practitioners.

I mentioned the use of a KWIC index for our pamphlet collection. Unfortunately this is not yet in operation, but I feel that such an uncontrolled language as is produced with this kind of index will require some form of thesaurus, if only to control synonyms and to aid the making of the occasional generic search. This will obviously use more specific terms than the headings used in the disseminating media already discussed.

Yet another area in which a thesaurus would be useful is in organizing our slide collection. This is only a small collection of close on three thousand items. The slides have been collected over the years as an aid to giving lectures largely to the general public on the work of the GLC Department of Planning and Transportation. At present they are in accession number order with an alphabetical subject index on cards. We had thought of using co-ordinate indexing with optical coincidence cards but this system did not seem appropriate in this case. Our customers indicate that they have to give a lecture on motorways, or traffic, and require a set of slides to illustrate the subject. We are not asked for a picture of an elderly man boarding a double-deck bus in the rush hour at Marble Arch. This type of enquiry would require a co-ordinate index but since the need has not yet arisen a more sophisticated tool than a card index is not required. However, it would be very handy to have a thesaurus for two main reasons. Firstly, even with a slide collection where one generally makes up one's own description there is a need for vocabulary control. Should a picture illustrating car parking be entered as such or simply under Parking? Secondly, the would-be lecturer on, say, the work of our Construction Branch, would like a list of GLC road development schemes such as the Bricklayers Arms, the Thamesmead Spine Road or the Blackwall Tunnel Southern Approach. In order words, the terms we have used to describe slides must be arranged into some sort of hierarchy.

The final area in which we require a thesaurus is in conjunction with our operation of the Document Processing System. The DPS package is a computer system providing for the creation of document files by storing in machine-readable form, either full text, abstracts or keywords. The application program converts input records into three searchable files. The system then compares, on a word basis, the contents of the text portion of the input record against a dictionary file containing words obtained from previous processing. These words are, of course, *uniterms*. The terms 'new towns', for example, being the two words 'new' and 'town'. Two words can be made to make a term by use of the hyphen, e.g. COST-BENEFIT or IN-SITU. If the word already exists in the dictionary file, the identification number of the input record containing the word is placed in a Vocabulary file, together with all previous record numbers containing this word. A third file, the Master, contains, for each input record, the bibliographic information contained in the record.

Two optical files may also be created: (a) an Auxiliary Text file, which stores the actual text on the record, and (b) a Synonym/Equivalent file, created by the user, which causes the search to be extended to words with similar meaning to those actually requested. It is in this area that a well constructed thesaurus would be an asset. Another feature of the system is the availability of a user-generated exclusion table, which causes the system to purge common words. Two-letter words and words commencing with numerals are automatically excluded. This means that care must be taken at the input stage to see that such words as BY-PASS are always hyphenated. So far we have a list of about two hundred excluded words which include such superfluous terms as 'chiefly', 'enables', 'likewise' and 'probably'. This in itself is a kind of thesaurus and may be used again as part of our KWIC system. Other features of the system include word and document frequency counts, limiting of dictionary size if required, the option of fixed or variable word lengths, and truncated word searches, e.g. a search instruction such as SOCI(£) will cause a search to be made for all words beginning with SOCI, e.g. SOCIOLOGY, SOCIAL, SOCIALIZE, SOCIALIZATION, and SOCIALISM. In order to make a search request, the user indicates a combination of search words, possibly contained by relative position indicators such as word distance, sentence or paragraph. The bibliographic data of documents satisfying the search criteria are then printed out. The abstract, or even complete text, if available, can also be printed if desired. In framing his question, the customer can be greatly assisted by the Index list. This is a complete list of words in the dictionary file which also gives the number of documents in which each word is found (i.e. document frequency) and the number of times the word occurs (word frequency). These lists are going to be of considerable value in compiling our thesaurus and I shall return to them later.

Having established the need for some kind of thesaurus, the next task it to try and discover some basic principles which can be used in its construction. The method of arrangement and other more practical matters will then have to be considered. It is generally accepted that there is no theoretical bias for selecting keywords and arranging them in lists or thesauri. This being the case, the only principle that suggests itself is that a thesaurus, no matter what the subject field, should be user orientated. The Research Library at GLC tries, in fact, to ensure that all its services are user orientated. We are prepared to abandon any of the traditional library disciplines such as cataloguing, classification and book selection if we discovered that they did not benefit our customers. I think this is an attitude adopted in most special libraries and consequently the philosophy behind the construction of any thesaurus must follow this general approach. This means, for example, that natural language terms should be used, since library users do not speak in inverted phrases. It also means that new relationships between terms will have to be indicated as and when required and not remain static, as so often happens in other library routines such as cataloguing and classification. Before constructing a thesaurus in any field the first step is to see whether any similar list exists which could be adopted as it stands or with some minor amendments. In Planning, there already exists a thesaurus published by Essex County Planning Department, the second edition of which appeared in 1969.[2] This appears to be a unique achievement in this country and is well worth considering.

The library of the Essex Planning Department is quite small and is without a professional librarian and, in order to keep track of documentation in the field, journal articles are indexed, using the *Featureword Thesaurus*, by the staff of the whole department, thus spreading the load. To quote from the foreword: 'The principal aims in the design of the featureword thesaurus have been to eliminate vagaries of individual differences between users by restricting words to an approved list, within built "redirection" for false choices by users, and to leave open the possibility of introducing further featurewords as new and unexpected data comes to hand.' The articles indexed are filed in accession number order and the featurewords assigned are posted onto conventional co-ordinate indexing cards. Generally the number of terms per document is restricted to three or four featurewords. The system has grown rapidly during the couple of years it has been in operation and a change to optical coincidence cards may well be necessary in the not too distant future. Incidentally, it has been discovered that with a few additions to the basic list the same thesaurus can be used to index the Planning Department's collection of maps and plans using a parallel co-ordinate indexing system backed up by a Location Code.

This particular thesaurus was constructed by asking several members of the planning staff to jot down terms which they thought relevant. These were then compared, synonyms eliminated and an attempt made to arrange them into some sort of hierarchy. At the head of the 'family tree' was placed the much overused term ENVIRONMENT since this is what planners are supposed to be concerned with. It was decided that it was synonymous with AMENITY (denoted by the now standard abbreviation UF) and such obvious narrower terms (NT) as WORKING CONDITIONS, ADVERTISING, TRANSPORTATION were indicated. Problems arose because some terms would not fit into this 'family tree' which indeed became rather in need of pruning. The term TECHNIQUES and such related terms as TERMINOLOGY, GAME THEORY and PLANNING PRACTICE would not fit into the hierarchy since ENVIRONMENT is something concrete and these terms denote theoretical and methodological concepts and are thus incompatible. This is not important, however, and does not make the thesaurus any less useful. The task of fitting all branches of knowledge into two-dimensional hierarchies is impossible since many terms belong to more than one hierarchy. HISTORIC BUILDINGS, for example, is subordinate to both the term ARCHITECTURE and also CONSERVATION. Let us leave such matters to the theorists—it is of no practical importance.

Some terms in this thesaurus are prefixed with the abbreviation UW (use with) to indicate other possible featurewords with which the main featureword may be combined to produce a compound featureword, for example:

FLOODING
UW Sea

MINERAL EXTRACTION
UW Surface
UW Underground
UW Coal
UW Gravel
UW Sand
UW Sand
UW Clay
UW Chalk

On occasions a featureword may exist for which a synonym might be produced by combining two other featurewords, e.g. the featureword PRIVATE VEHICLES might be duplicated if the alternative individual featurewords PRIVATE and VEHICLES were combined. To guard against this, under each featureword is given a list of other featurewords with which the first featureword must not be combined. These prohibited combinations have the prefix 'P', for example:

PRIVATE
P Vehicles
P Parks and Gardens

FACILITIES
P Recreational
P Entertainment
P Educational

Localities are excluded from this thesaurus, as indeed they must be from any thesaurus in a subject like planning otherwise subject terms would be swamped by a host of place names. Place names are included, however, when part of a proper name, e.g. ESSEX RIVER AUTHORITY, LEA CONSERVANCY CATCHMENT BOARD and NORTHUMBERLAND NATIONAL PARK. I am not quite sure that such corporate bodies together with others like the NATIONAL TRUST should be included in a thesaurus. Their place would seem to be in a corporate body index similar to an author and title index. There is a rather strange exception to the ruling on place names and we find the entry:

WORLD
NT Europe
  Australia
  Africa
  Asia
  N. America
  S. America

In practice it has been found that a considerable number of the terms included in this thesaurus have not yet been used for indexing. A future edition will probably eliminate these from the list. Very few new feature words have had to be added to the thesaurus so we may expect little or no increase in the size of the third edition.

Compared with Greater London, the Essex County Planning Department is small. We have a staff of nearly 1,500 and, although I consider it a good idea for library users to contribute all the terms for an intended thesaurus, I have no intention at this stage of soliciting members of the Department for words which they consider to be important in the field of planning and transportation. If each member of staff on an average wrote down fifty words on cards I should be faced with 75,000 cards to sort and edit and I am not convinced that the end result would be any improvement on the other methods which I am about to suggest.

In a recent biography of Peter Mark Roget,[3] D. L. Emblen tells us that the compiler of the first thesaurus trained as a doctor but also flung himself into almost every branch of science he could lay his hands on. Optics, chemistry, physiology—in all these and more he did serious and sometimes important work. Only at the age of seventy did he begin work on his thesaurus. Although the thesaurus we are planning will have a different use and structure, like Roget himself we have a diversity of interests. Planning nowadays, rightly or wrongly, is concerned with almost every aspect of human endeavour. It is concerned with all types of building, with the movement of goods and people by both conventional and unconventional methods. It is concerned with economics, population growth and control and every type of outdoor recreation. Ideally, planners should know the needs of the population for several years to come and also have forecasts of how technological and economic progress will both motivate and achieve these ends. In London, as elsewhere, planners are interested in both large and small things. When and where the Channel Tunnel is built must affect the transportation needs of the capital as well as the rest of the South East. At the other extreme a revolutionary method of collecting bus fares could possibly greatly improve London's overcrowded commuter services.

Planning and Transportation, therefore, cannot be considered as a neat, self-contained, easily designated subject field. In consequence, we must expect our thesaurus to be necessarily large with a considerable number of hierarchies and the resultant difficulties in homonym and synonym control. The task is made more difficult because many terms are ill defined, especially the broader, more general terms like 'environment', 'transportation', 'development' and 'redevelopment'.

The basic terms like 'Roads' and 'Highways' cannot be regarded as synonymous but we lack clear definitions. I quote from an American textbook *Economic analysis for highways*[4] by Robley Winfrey in which the author states: 'Throughout this book the word "highways" is used to include all highways, roads, streets, parkways, tunnels and bridges—rural and urban, without distinction.'

Glossaries do exist in this field and may give some aid in selecting the correct terminology. A glance at The British Standard (BS 892) *Glossary of highway engineering terms*[5] quickly shows that the above definition of highways is inadequate. Here a highway is defined as 'A way for the passage of foot, animal or vehicular traffic and over which such traffic may lawfully pass'. A road, on the other hand, is 'A way for vehicles and for other types of traffic which may or may not be a highway as it may or may not be lawfully usable by all traffic'. Also defined are Trunk road, Classified road, County road, District road, Radial road, Ring road, Loop road, Service road, etc. The *Vocabulary of traffic engineering terms*[6] published by 'Traffic Engineering and Control' defines both British and American terms, e.g. 'maximum running period' (British) and 'extension limit' (American) are synonymous for the time that a green signal can continue after a demand had been made by traffic on another phase. Another useful guide is the *Countryside Recreation Glossary*[7] published by the Countryside Commission which defines 'Recreation' as: 'Any pursuit engaged upon during leisure time other than pursuits to which people are normally highly committed.' For a user-orientated thesaurus, however, glossaries should not be the primary source of terms to be included in the list. There are several reasons for this. Firstly, no glossary exists which covers the whole field of planning and transportation adequately enough for our needs. Secondly, glossaries do not include certain words which one would expect to find in an hierarchal thesaurus; whereas different types of structures may be listed and defined, the general term BUILDINGS may be excluded since it does not require a definition in the context of a particular glossary. Thirdly, glossaries tend not to include some of the newer terms such as CABTRACK, MINITUBE etc.

If we accept that our users read the documents incorporated into our system, then it would seem logical to assume that they will be familiar with the terms used in them. This being the case, the best method of generating a list of terms is to allow the documents to do just this. All we have to do is to assess the best method of listing and evaluating terms used in a particular collection of documents.

Manual methods could be used. This would involve, for example, checking *Planning and Transportation Abstracts* for significant words, i.e. words used in the abstracts themselves, not merely those used as headings. A similar exercise could be carried out on the *Daily Intelligence Bulletin*. Not only would this method be time consuming and laborious but its success would depend very much on the nature of the abstracts. If the abstracts contain all, or most, of the significant words contained in the original document, the result may well be very satisfactory. But when abstracts state merely, 'This is a controversial but well illustrated account of modern trends', they are of little or no use for an exercise such as this.

Our computer systems may be of more help in producing a list of possible terms for including in our thesaurus. It will be possible to use both the DPS and the proposed KWIC index for this since the data base for both is gained from documents in the library. First let us consider the possibilities of DPS. The Index List output provides us with an edited list of words within the system giving both a document frequency count and a word frequency count as well as a list of document numbers. Before preparing this paper I had a run on words beginning with the letter 'C' for the five hundred documents which were in the system at the time. From this, for example, it can be seen that the word CAPACITY occurs thirteen times in nine documents, while its plural CAPACITIES occurs only twice in two separate documents. Names of localities also occur, such as CAMBRIDGE, CAMDEN etc. which can be ignored since it does not seem that we shall be including them in the final thesaurus. CAMERON, CARTER and CHAMBERS also appear and are obviously proper names which can be eliminated. The danger arises, of course, if surnames are homonyms of subjects. If we were constructing an horticultural thesaurus and a man called ROSE was a prolific writer, we could be misled as to the importance of ROSE as a term. Fortunately Cecil Rhodes did not write on transportation and even if he did he only presents us with a homonym and not a homograph. Let us hope that Green Belt, Motorway and Environment never become popular surnames!

One major defect of the DPS Index List as far as selecting terms for a thesaurus is concerned is that it contains only 'uniterms' unless two words are linked by a hyphen. This does not matter when a search is conducted with the aid of a computer but for our purposes such terms as NEW TOWNS, IMPROVEMENT GRANTS and LAND USE will not be included in this form. Care must be taken at the editing stage of DPS to see that words like USE and NEW are not added to the common word list as one might expect. To do so would give a negative result if searching for material on new towns. Colours must not be added to the list of common words either. Not only is GREEN BELT an important term, but we speak of GREY AREAS and may require to search for documents on the operation of RED ARROW BUSES or the use of YELLOW LINES in parking control zones.

Many of the words appearing in the Index List will find no place in a thesaurus because they are too vague. Such words include CAREFUL, CAPABLE, CIVILIZATION, CLOSER, etc., etc. Of the words that remain, however, the List can be of considerable assistance not only because it is based on a relevant document collection but also it can give a guidance in selecting the form of a word and the choice of synonym.

In indexing and thesaurus construction, by tradition, one usually selects plural nouns or the singular collective noun, and one's users are trained to use these forms as much as possible. This completely disregards whether it is natural for the user to form his search requests in these forms or not. My experience would seem to indicate that this basic rule has to be disregarded quite frequently, otherwise an index will contain unusual forms of words. The *Annual Abstract of Greater London Statistics*[8] gives figures of indictable offences known to the police. Offences in the table are listed in the singular—Murder, Assault, Robbery, Forgery, etc., but when indexing these I converted them all to the plural. Most entries seemed quite natural until I indexed 'Rape' which in the plural does not seem right. One could, perhaps, make detailed rules for word forms when constructing a thesaurus but a simpler method would seem to be to base the form on the number of times a particular form occurs in a given set of documents. In the Index List one can do this quite easily. Thus we have:

	Doc. Frequency	*Word Frequency*
CLASSIFICATION	6	7
CLASSIFICATIONS	2	2
CLASSIFIED	2	2
CLASSIFY	1	1
CLASSIFYING	1	1

If similar results were produced with a larger set of documents one could assume that CLASSIFICATION was the most popular form of the word and include it in this form in the thesaurus.

There are dangers in this, however, due again to the fact that we are dealing with 'uniterms'. Although the singular form CAR occurs seventeen times as opposed to the plural CARS occurring only seven times, one suspects that this is due to the fact that CAR always occurs with another word to form such a term as CAR OWNERSHIP or CAR PARKING. Any suspicions such as these can, of course, be verified by checking the list of documents cited by the Index List.

To aid the choice of synonym the same list can be a guide to the popularity of a particular term. So if AGED occurs fifteen times and ELDERLY only five times, one must select AGED even if personally the other term appeals more. There are difficulties in that synonym may be of two words such as OLD PEOPLE and a careful investigation of the two words involved in the term would be required before arriving at a decision. One must also be sure that one is dealing with current documents and that the documents are by English authors, or care has to be taken to 'translate' from the American when abstracting.

Our KWIC index, when produced, will also provide us with a list of terms to be included in a thesaurus. The Documentation Center for Urban Studies (KDZ) of Vienna has already produced a KWIC index in this field. Many of the documents have English titles and an examination of their list quickly indicates its value for our present purposes. A look at the word DEVELOPMENT, for example, would seem to indicate that it has little or no significance as a term until combined with another word to give:

TOWN DEVELOPMENT
ECONOMIC DEVELOPMENT
COMMUNITY DEVELOPMENT
REGIONAL DEVELOPMENT
DEVELOPMENT PLANNING etc. etc.

Also obvious is the fact that URBAN and TOWN are synonymous in this context.

PLANNING is a word that can be used by itself or as part of a term such as CITY PLANNING, SOCIAL PLANNING, LONG RANGE PLANNING, ECONOMIC PLANNING etc. When used by itself it should be used to indicate the concept of what used to be called 'Town and Country Planning'. Unfortunately almost any activity can be planned and the word PLANNING. then becomes what may be termed a subheading or even a role indicator as:

MANPOWER–Planning
LIBRARIES–Planning.

The same word can also be part of the name of a system as in the term PLANNING, PROGRAMMING AND BUDGETING (PPBS).

This presents us with the problem of homonym control, which is a very vital role of any thesaurus. Fortunately there are few, it would seem, in the planning and transportation field. A park can be somewhere to leave a vehicle, in which case we term it a CAR PARK, otherwise it is a recreational area, when the simple term PARK can be used. Our KWIC index when produced will be the best guide for solving this problem.

In planning, perhaps more than in other areas, we are concerned with places, whether they are regions, counties, towns or districts. In consequence, any information system must be able to deal with requests related to specific areas. In the GLC we are not interested merely in developments in London or even the South East. Traffic plans for American cities could have some bearing on similer problems of traffic movement in Greater London. A unique solution to the environmental problems of living in high-rise flats may be solved in Belgrade. The failure of a bridge in Australia may require modifications to be made to the bridge design of a section of one of London's future urban motorways. If we accept that a subject thesaurus is not the place for topographical subjects then an alternative must be found. Essex County Library, as previously mentioned, uses a Location Code as part of its co-ordinate indexing system. This covers Essex locations in great detail and the rest of the world more generally. Each location has a unique code consisting of two upper case and two lower case letters, e.g. CHELMSFORD RURAL DISTRICT is LB/af. A document relating to this area would have its accession number posted on four co-ordinate indexing cards, i.e. L, B, a and f. To retrieve material these four cards would be selected from the file and the numbers compared. Subject cards may also be withdrawn at the same time so that a search could be made on ROAD BRIDGES IN CHELMSFORD RURAL DISTRICT. To ensure that certain index cards do not become overburdened, the allocation of codes is carefully controlled by means of graphical presentation, the capital letters A–G being along one axis, and H–Z along the other, the resulting squares being appropriated to certain areas. Further detail is obtained by the addition of lower case letters which are allocated by a similar method. This grouping of the code letters enables generic searches to be carried out, e.g. all locations in France are IA/c-. An alphabetical index is provided to the codes.

I am not certain whether a similar system would work for the GLC. One of our problems is that new names occur and names tend to change. Greenwich used to be a Metropolitan Borough but since 1965 is has been a London Borough and has included the former Metropolitan Borough of Woolwich. The term GREENWICH, therefore, can mean two different things; indeed, if we also recall that Greenwich was once the much smaller parish then it can relate to three areas. Thamesmead, which is situated in both Greenwich LB and Bexley LB used to be called in its earlier planning days Woolwich/Erith Riverside Development and a searcher on this subject must bear this in mind. One must consider, therefore, whether or not to construct a separate thesaurus of locational terms. London's Third Airport is a very topical and much used search term at the moment, but when concrete plans are eventually produced it will presumably have a proper name and London's Third Airport will become an outmoded synonym.

I have said little about the hierarchal structure of our proposed thesaurus. This is because I believe that the initial step is to assemble all the relevant terms. Having done this, it should be a relatively easy task to arrange them into some sort of useful and logical order. The procedure will be similar to that used in constructing faceted classification schemes, i.e. find isolates and by applying a series of characteristics to group them into facets. The compilers of enumerative schemes like Melvil Dewey erroneously started at the top of the tree and worked they way downwards. Compilers of thesauri should not follow in their tracks.

Finally, one has to consider whether to 'go it alone' or to co-operate with other libraries and information centres engaged in the same field. In the March issue of the *OSTI Newsletter* I read that a grant of £29,450 has been awarded to the Planning Research Unit, Department of Urban Design and Regional Planning, Edinburgh University, for a project to improve the organization of information for planners. This will involve the construction of a thesaurus—so perhaps GLC will never have to produce its own Planning and Transportation Thesaurus!

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CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

Items are available in the Aslib Library and may be borrowed unless marked to indicate reference copies.*

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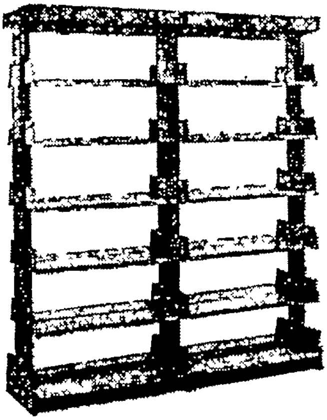

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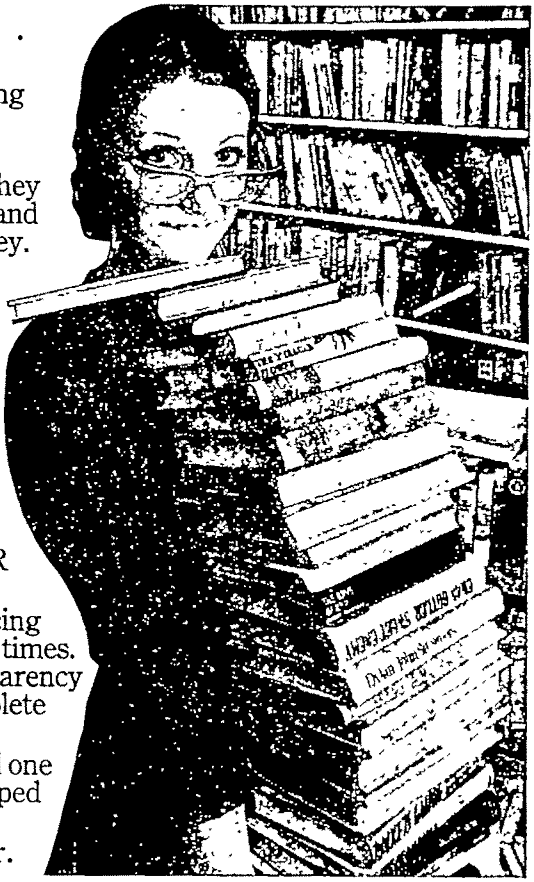

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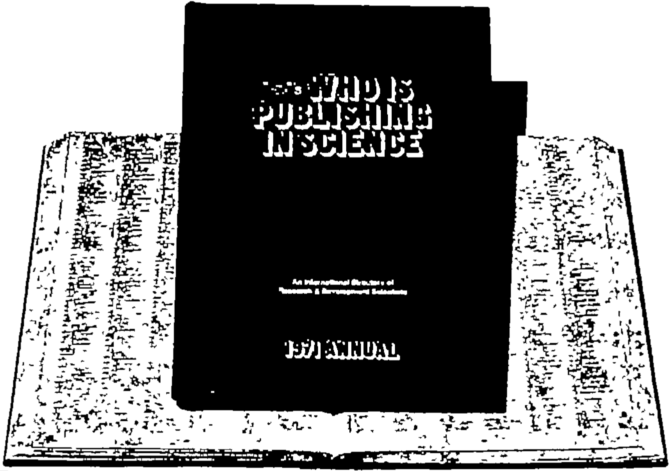
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MON.3.	Co-ordinate Indexing Group meeting: 'Use of outhouse thesauri'. Aslib. 3.30 p.m.
WED.5.	Chemical Group wine and cheese party, evening meeting and lecture. Aslib. 5 p.m.
WED.12.	Aslib evening meeting: 'The work of the Cambridge Library Management Research Unit', by J. L. Schofield (Assistant Director of Research). Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1. 5 for 5.30 p.m.
TUE.18.	Midlands Branch/Institute of Information Scientists evening meeting: 'Systems analysis and its application to library and information work', by H. East (Aslib Research and Development Department). Arden Hotel, Birmingham. 6.15 p.m.
FRI.21.	Technical Translation Group Annual General Meeting. Aslib. 3 p.m.

February

WED.9.	Scottish Branch/Institute of Information Scientists joint meeting: 'Computer-based information services'. University of Strathclyde. 6 p.m.
	Aslib evening meeting: 'Some uses of KWIC', by Dr F. W. Matthews. Aslib. 5 for 5.30 p.m.
TUE.22.	Midlands Branch afternoon workshop: 'Forward planning as related to library and information activities', by Mrs E. Mack, Mrs J. Aitchison, and Mr H. H. Goom. Arden Hotel, Birmingham.
THU.24.	Aslib visit: 'Computer publishing systems'. Oxford University Press, Neasden. 10.30 a.m.
FRI.25–SUN.27.	Engineering Group Conference: 'Costing library and information services'. Dunchurch Industrial Staff College, Nr Rugby.
TUE.29.	Computer/Data Processing Group evening meeting: 'Editorial policy and problems of some computing abstracts services'. Aslib. 5.30 p.m.

March

SAT.4–SUN.5.	Social Sciences Group Annual Conference: 'The British Library and the social sciences'. Bath.
WED.15.	Aslib evening meeting. Speaker: Charles Gibbs-Smith (Emeritus Keeper, Victoria and Albert Museum). Royal Institution of Naval Architects, London SW1. 5 for 5.30 p.m.

Membership subscriptions

As members know, the two years since Aslib's current subscription rates were fixed have been a period of the most acute inflation since the war. In order to maintain the existing services to members the Council of Aslib has reluctantly reached the conclusion that it has no alternative but to add to each subscription in 1972 a supplement equal to the fall in the value of money, i.e. 16 per cent spread over the two years and rounded up or down to the nearest 50p. It will be appreciated that this supplement will only offset the effects of inflation already experienced up to October 1971, and will not help in relation to any further inflation which may occur during the latter part of 1971 or during 1972; however, the Council is determined to keep this unavoidable increase to the minimum consistent with its duty to provide a proper standard of service to members, and has accordingly ruled that this rate of supplement shall remain fixed throughout 1972.

Aslib is among those non-profit organizations which inevitably suffer most from the evil effects of inflation, and the Council warmly welcomes the initiative recently taken by the Confederation of British Industries towards containing inflation by limiting any unavoidable increases in charges in future years to 5 per cent per annum. The Council also intends in subsequent years to support this welcome policy.

The work of the Cambridge Library Management Research Unit

The speaker at the Aslib evening meeting, to be held on Wednesday, 12th January, 1972, will be Mr J. L. Schofield, Assistant Director of Research at the Library Management Research Unit, University of Cambridge, who will talk on the work of the Unit.

It will not be possible, in the time available, to cover all the activities of the Unit in detail so Mr Schofield will concentrate on the aims, objectives and future of the Unit, and a summary of the findings of various projects.

The Unit, funded by OSTI, was created in order to undertake a programme of studies on the organization and systems of academic libraries. It was the first time that a British University Library had been provided with the resources for long-term enquiries into common problems, and it was planned that the Unit's investigations should extend beyond Cambridge to other universities. The programme of research is firmly based on practical, direct investigation of clearly defined problems and it was considered that the most effective contribution that could be achieved would be the development of generalized methods of operational analysis that could subsequently be applied by librarians in their own libraries.

The meeting will be held at the Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1, and will be chaired by Dr B. J. Enright (Librarian, University of Sussex). It will begin at 5.30 p.m. (tea 5 p.m.).

Social Sciences Group Annual Conference

As announced in the August issue, the Social Sciences Group will be holding

Medical Library Association: International Cooperation Committee

The American Medical Library Association invites applicants from abroad to apply for a fellowship of six months in medical librarianship in the United States. There will be one award granted during the 1972/73 academic year. The programme will include observation and work in a United States medical library with attendance at a six weeks' course in medical librarianship. A monthly stipend, tuition and travel in the USA are provided. Candidates usually seek funds for travel to this country from other sources. Applicants should be working in or preparing to work in a medical library. They should be prepared to work in their own country for a period of two years after completion of the fellowship. Proficiency in the English language is required.

For further information, inquiries may be sent to: Dr Carroll Reynolds, Chairman, MLA Committee on International Cooperation, Falk Library of the Health Professions, University of Pittsburgh, Pittsburgh, Pa. 15213.

Storage and retrieval of biological information

From 5th October to 14th December 1970 the Linnean Society of London and the Committee on Biological Information (of which Aslib is a member) held a series of lectures on the storage and retrieval of biological information. A number of these lectures have recently been published in the *Biological Journal of the Linnean Society* (Vol. 3, no. 3, September 1971), which is available from Academic Press Inc. (London) Ltd, 24–28 Oval Road, London NW1 7DD, price £2.25.

Thesaurus of computing terms

The National Computing Centre has recently published a *Thesaurus of computing terms*. The *Thesaurus* consists of a structured list of descriptors that can be used to index information on computing or computer applications. This information can be books, technical literature, programs, hardware, etc.

At present the NCC *Thesaurus* contains over 4,000 descriptors and is continuously being updated by the addition of new terms and relationships. It is available in the standard thesaurus format (i.e. Engineers Joint Council) and is compatible with other leading thesauri. It can be purchased on a quarterly or annual subscription basis.

For further information, contact: Peter Wheeler, Head of Publications, NCC, Quay House, Quay Street, Manchester M3 3HU.

Chemical Abstracts

Chemical Abstracts Service has announced that as from January 1972 abstracts in seventeen of the eighty subject sections of *Chemical Abstracts* will be processed and composed for printing by computer. CAS plans to convert further sections of *CA* to computer-produced production over the next few years. About 65,000 abstracts—some 20 per cent of the total to appear in *CA*—will be processed through the system in 1972.

BRIEF REVIEWS

ENCYCLOPEDIA OF INFORMATION SYSTEMS AND SERVICES. Edited by Anthony T. Kruzas. Ann Arbor (Michigan): Edwards Brothers, 1971. 1109 pp. $67.50

Prospective buyers may be misled by this book's title: it is not what is usually understood by the term 'encyclopedia'. It is true that its coverage is comprehensive as far as the number of organizations and services is concerned and that each of twelve full indexes covers the contents from a different angle, but the information dealt with is entirely factual, referring to named activities rather than to information services as a field of knowledge within information science.

In fact the major portion of the book consists of information on the services provided by 833 organizations in the USA and Canada. The entries are arranged alphabetically by organization. The data for each entry are based on information supplied in response to a questionnaire with backup from secondary sources, and includes, under separate headings, brief personnel details, description of the system or service, its scope or subject coverage, input sources, holdings of recorded data, serial and non-serial publications, microform, tape and other services, computer and information processing equipment, user equipment requirements, and user restrictions. This last heading is important, since services really intended for internal use rather than as services on a commercial basis are included.

The twelve indexes include an acronym and initialisms section, organizational and personal names, serial publications, and a variety of specialized services, such as abstracting and indexing services, computer applications and services, networks and co-operative programs, SDI, and research.

As a guide to organizations and services principally concerned, as the preface states, with storage, retrieval, and dissemination of information by innovative experimental or non-conventional means, this volume is usable and should prove well-used. It is also worth noting that there are plans to publish revisions on a continuing basis.

METRINS: A GUIDE TO METRICATION INFORMATION AND SOURCES. Compiled by London Borough of Lewisham, Technical Reference Library. London: the Library, 1971. 27 pp. Free on request.

To all those who are of necessity involved in the conversion to the metric system this booklet will prove to be of considerable value. While not aiming at comprehensiveness, it nevertheless provides good, well annotated lists of relevant publications, including references to more detailed bibliographies, and of bodies actively involved in metrication. The layout is as follows: first a bibliography of the more important texts—general basic works, subject orientated publications and metric conversion tables; secondly, bibliographical sources, including those sources of information currently being published; finally a listing of the activities of those bodies involved in metrication, both trade and professional associations and official bodies. Sources of information on, for example, conferences, films and posters are also indicated. Although this booklet does not have an index, the information contained in it should be readily extractable both by librarian and layman alike.

UNIVERSITY OF LIVERPOOL. Finding list of periodicals excluding the humanities. The University, 1971. 251 pp. £1.00.

The scope of this new edition has been extended to include periodical holdings in law, geography, sociology and political science. The first edition, published in 1966, listed periodicals in the fields of science, medicine and technology only. Details are given of closed sets as well as of current titles.

The holdings of twenty-nine libraries in the immediate area of the University of Liverpool, including several which are not part of the University, are listed.

The compiler states that it is hoped later editions of the list will be enlarged to cover all subjects and to include the holdings of other libraries in Liverpool.

WOODWORTH, DAVID, *comp.* Directory of publishers of British journals. London: Library Association, 1971. 200 pp. £3.50 (£2.80 to LA members). (SBN 85365 274 0)

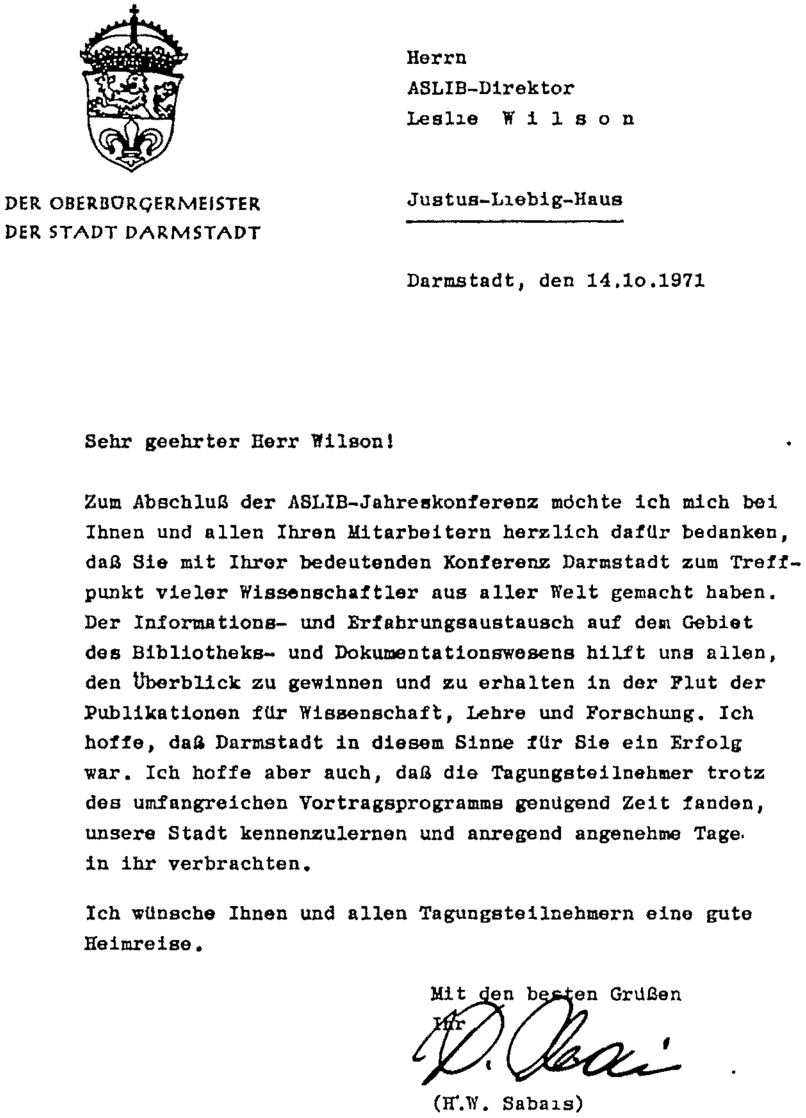
This publication is both complementary and supplementary to the author's *Guide to current British journals* published in 1970. In fact this volume includes many more titles of journals, although no details other than the publisher's address are given. The arrangement is alphabetical by name of publisher; each entry includes the address and the periodical titles which the company or organization issues. Over 4,200 publishers are included. There is an alphabetical index to journal titles.

In addition to the more well-known journals the editor says that an attempt has been made to provide comprehensive coverage of underground journals and house journals as well as publications of local societies. Among categories not included are parish magazines, daily press, children's comics and 'pin-up' magazines.

45th ASLIB ANNUAL CONFERENCE DARMSTADT, WEST GERMANY

10th–14th October 1971

Letter of congratulations on the success of the Conference received by the Director of Aslib from the Lord Mayor of Darmstadt



DER OBERBÜRGERMEISTER
DER STADT DARMSTADT

Herrn
ASLIB-Direktor
Leslie Wilson

Justus-Liebig-Haus

Darmstadt, den 14.1o.1971

Sehr geehrter Herr Wilson!

Zum Abschluß der ASLIB-Jahreskonferenz möchte ich mich bei Ihnen und allen Ihren Mitarbeitern herzlich dafür bedanken, daß Sie mit Ihrer bedeutenden Konferenz Darmstadt zum Treffpunkt vieler Wissenschaftler aus aller Welt gemacht haben. Der Informations- und Erfahrungsaustausch auf dem Gebiet des Bibliotheks- und Dokumentationswesens hilft uns allen, den Überblick zu gewinnen und zu erhalten in der Flut der Publikationen für Wissenschaft, Lehre und Forschung. Ich hoffe, daß Darmstadt in diesem Sinne für Sie ein Erfolg war. Ich hoffe aber auch, daß die Tagungsteilnehmer trotz des umfangreichen Vortragsprogramms genügend Zeit fanden, unsere Stadt kennenzulernen und anregend angenehme Tage in ihr verbrachten.

Ich wünsche Ihnen und allen Tagungsteilnehmern eine gute Heimreise.

Mit den besten Grüßen
Ihr

(H.W. Sabais)

THE INFORMATION SCENE IN GERMANY AND BRITAIN

1. The German Information Scene

MARTIN CREMER

Director, Institut für Dokumentationswesen

Paper presented at the 45th Aslib Annual Conference, Darmstadt, West Germany, 10th–14th October 1971

IN JUNE THIS YEAR I and some of my colleagues had the opportunity to discuss the general situation in the information field with our opposite numbers in your country. We found many similarities and conformity and therefore I do not intend to give you a complete description of the organizational structure in the Federal Republic today. I prefer to discuss some outstanding problems:

- I. The general organization (information policy).
- II. The management of information centres.
- III. Problems of international co-operation.
- IV. Education and training.
- V. Special problems of the present and future development.

I. The general organization (information policy)

On the governmental level the responsibility for the national information policy and for the participation in international organizations rests with the Federal Ministry for Education and Research. This Ministry finances central institutions as well as specialized centres in the field of nuclear energy, aeronautics and space, chemistry, and the social sciences. In addition each federal ministry is responsible for special services in its respective field (medicine, public health, agriculture, geo-sciences, patents, defence, etc.).

To implement the information policy, the Federal Ministry of Education and Science prepares a five-year plan to lay down the responsibility and the financial support by the Federal Government. This plan will cover the subsidies to information services as well as the support of the 'infra-structure' (Education and Research, Equipment, especially EDP and Reprography, and Standardization). This plan will be presented to the Government and to Parliament at the end of this year.

In this connection the very real problem of sharing the costs between state, industry and commercial organizations should be mentioned. Apart from the large number of internal services in enterprises, there are information systems in which mainly industry and trade are interested, which nevertheless are, or should be, available to all other potential users. The Government has become more and more aware of its principal responsibility in relation to the support of scientific libraries or scientific and technological development in general.

There are the following possibilities of sharing the costs:

1. Financial support for research and development for a specific system, e.g. what is actually done in the field of chemistry.
2. Joint financing of the implementation of new services, e.g. in the field of marine engineering.
3. Complete financing by the Government and offering, after a period of development, information to commercial users at partly cost-covering prices, e.g. plans now under way to establish a materials data bank.

Of decisive importance for the realization of national information policy are the activities of our central institutions, from which the following should be mentioned:

1. Institut für Dokumentationswesen (IDW) has been established as a part of the Max Planck Gesellschaft in 1961 to co-ordinate and promote documentation and information projects on a national level and within the framework of international co-operation. This includes financial support from our own budget given by the Federal and the Länder Governments as well as giving advice to the Government, to the scientific institutions and to industry. Financial support covers the starting period of projects, pilot studies, research and training. The Institute includes a Centre for Reprography with the following tasks: observation of new developments; testing of new equipment; development or participation in the development of new equipment; consulting with information centres, libraries, academic and private institutions on the creation of their own reprography services; training and retraining.

2. Deutsche Gesellschaft für Dokumentation (DGD) is responsible for the promotion of information research and practice and international activities on the level of a learned society. The DGD is the national member of FID and runs the training centre for Documentation. Incorporated into the DGD is the Gesellschaft für medizinische Dokumentation und Statistik (GMDS).

3. Zentralstelle für maschinelle Dokumentation (ZMD) serves as a centre for research and development for computerized projects. Its activity is at present concentrated on the mechanized production of national or specialized bibliographies, abstracts journals and retrieval systems. Basic research deals mainly with problems of automatic indexing. The training activities will be mentioned later on.

Other institutions, such as Deutscher Normenausschuß (DNA), Deutsches Rechenzentrum (DRZ), Studiengruppe für Systemforschung, and Arbeitsgemeinschaft der Spezialbibliotheken (ASpB), are to some extent parts of the 'infra-structure' but can only be mentioned in passing.

II. The management of information centres

The number and the organizational structure of information services, as everywhere, is great and manifold. Besides the big secondary publications in the field of physics, mathematics, astronomy and astrophysics, and medicine, other centres for large discipline- or mission-oriented fields have been set up or are in preparation. These centres, mainly run by government or non-profit organizations, either handle all documentation and information activities or form a co-operative system with special agencies. They are currently combined with corresponding research institutions and special libraries. I can mention only a few: Zentralstelle für Atomkernenergiedokumentation (ZAED) is a good example of an organization which uses a fully integrated automatic system for its library, documentation and information services. Similar centres exist for aeronautics and space sciences, chemical technology, geoscience, medicine, transport, oceanography, special fields of engineering like textile technology, foundries, metals and mining, materials testing, etc. Other central institutions in the fields of agriculture and marine engineering, a data bank for properties of materials, and central information systems for standards, are in the stage of planning or preparation. In the field of chemistry, electrotechnology and electronics, in the field of management science and overseas research (to mention two projects in the area of social sciences), special documentation services are combined to form one association with a common concept and common facilities.

It is evident that such centres have close co-operation with other respective national or international institutions.

III. Problems of international co-operation

In the field of international co-operation I would just like to draw you attention to a few principles:

1. There are national information services of international importance. Here Germany took the first steps in the creation of (a) the big 'Zentralblätter'; (b) the chemical handbooks by Gmelin and Beilstein; and (c) the tables of constants by Landolt-Börnstein.

Today the most important are services in the English language, such as CAS, Biosis, MEDLARS, INSPEC or the CAB publications. The problem is that we have to accept these large systems as well as look after our own interests through our own additional services or through a kind of partnership between the two. Such a partnership could involve the input of our publications into the system thus exerting some influence over the system development.

2. Other systems are maintained by international organizations, for example INIS, ESRO, and perhaps in the near future AGRIS. There is no doubt of the importance of such real international or worldwide systems but there is, also, a real awareness of the difficulties relating to their management.

3. Finally there are systems which are organized bi- or multi-laterally. We have gained some useful experience in this field mostly through non-governmental and therefore relatively flexible agreements. Some of them are supported or initiated by IDW itself. International Food Information Service (IFIS) is based on an agreement between CAB, the US Institute of Food Technologists, Pudoc in the Netherlands and IDW, with technical assistance from ZMD to produce a fully automated abstracts journal with monthly and annual indexes and a corresponding tape service. This project from my point of view has become a successful and nearly self-supporting system and should serve as a model for other systems (e.g. *Aquatic Sciences and Fisheries Abstracts*, a project based on an agreement between FAO, IDW and institutions in the UK, France and Germany). I would also like to mention International Management Information System, whose services are based on the evaluation of scientific literature by

fifteen German research institutes and eight foreign members from the USSR, France, Italy, Netherlands, Spain, and the UK.

IV. Education and Training

1. Documentalists are mainly trained at the Lehrinstitut für Dokumentation (school of documentation) of the Deutsche Gesellschaft für Dokumentation in Frankfurt.

We separate documentalists into three grades: (a) documentalists with academic education; (b) documentalists without academic education; (c) assistants to the documentalist.

For 'documentalists with academic education' requirements are a master's degree in one or two disciplines, one year of practice in a documentation centre and a one-year, part-time course at the Lehrinstitut für Dokumentation.

The training of 'documentalists without academic education' aims at more practical but responsible posts and consists of two-years' practice in a documentation centre and a one-year undergraduate course at the Lehrinstitut für Dokumentation.

The 'assistant to the documentalist' is mainly trained in documentation centres for two years. This training is completed by short courses in reprographic techniques, data recording and an intermediate and terminal course at the Lehrinstitut für Dokumentation.

2. The training of medical documentalists, who have to handle medical literature as well as medical data, takes place separately in a school which was opened on the 1st September 1969, at the Department of Medical Documentation, Statistics and Computer Processing in Ulm. The main subjects of the two-year, full-time, undergraduate course are medicine, mathematics and statistics, literature and data-documentation, data processing, library science and administration. The training aims at more practical, but responsible posts in institutions just mentioned, insurance companies, the Ministry of Health, etc. From the number of inquiries made to the school there seems to be a great interest in this professional training. A second school is being opened at Giessen this autumn and the foundation of further schools is planned.

Besides this undergraduate training, lectures in medical documentation and statistics are offered at universities and the new syllabus for medical students contains medical documentation and statistics as a compulsory subject for examination. At German universities there are currently eleven chairs for medical documentation and statistics.

3. Besides these professional courses of a common nature there are 'continuing-education courses' on specialized themes.

Such specialized courses are provided by:

(a) Zentralstelle für maschinelle Dokumentation (Centre of mechanized documentation) in Frankfurt a.M. Two-week courses for data input and data structure; four-week courses for mechanized documentation.

(b) Reprographic Department of the Institut für Dokumentationswesen in Frankfurt a.M. One-week courses in reprography (introduction to reprographic techniques and new developments).

(c) Deutsches Rechenzentrum (German Computer Center) in Darmstadt. Four-week programming courses in FORTRAN IV for non-numerical problems.

Besides qualified librarians and documentalists there is an increasing need for experts to investigate information processes and methods, and plan, develop and operate information systems. These problems belong to the new scientific field which is called—not uniformly—information science. The objects of information science are information processes and information systems. That means: information science includes the investigation of information processes in the scientific, technical, political, cultural, economic and administrative fields.

This new scientific field is not a single discipline but an interdisciplinary field, which extends from documentation science and library science over methods of system analysis to fundamentals of linguistics, cybernetics, communication theory, mathematics, etc. Often computer science is considered synonymous with information science, but they are considerably different. Whilst information is concerned with information processes and information systems whether they are mechanized or not, computer science aims at investigating the field of computer design and computer application.

At present there do not exist regular curricula in German universities to study information science. But there are some starting points, which could possibly be expanded.

To realize an extensive training programme transitional solutions will be necessary. In the beginning, concentrated but comprehensive courses for students with a master's degree in a suitable discipline could help to diminish the lack of information scientists. This is the aim of a two-year, post graduate training programme in information science specializing in indexing and retrieval, which was started at the Zentralstelle für Maschinelle Dokumentation in 1971.

V. Special problems

1. Extension of kinds of documents and data. As in many other countries an increasing demand for information is now being made which is not confined to scientific publications, patents, reports, etc., but also extends to data and facts of other kinds. In our country this development began in the field of hospital records and medical statistics. Some activities have been supported by IDW at an early stage. After a lot of reservations in the beginning it resulted in a strong demand for such information from medical research and practice as well as from public health and social administration. The most recent development concerns data and facts from law, taxes and budget, economics, statistics, education management, and social sciences. In a study presented by the Federal Ministry of Interior a nationwide system of information and data banks is discussed in order to answer the needs of the present and future industrial society in general. Considering the increasing relation between scientific and technological progress and social problems (environmental research and control, urban and traffic planning, public health, modern biology, etc.) we cannot deny that there is a changing and legitimate need for information in a changing society. The problem is: to what extent are documentation and

information, in the present sense of the terms, competent enough to deal with the development and maintenance of such data banks or information systems?

2. Finally I would like to mention the problem of the user. We know that the scientist as a result of the further increase in the number of publications has more and more difficulty in using secondary publications covering a broad field. Specialized services have advantages but they increase the number of such services. Now such systems are replaced by computerized systems, which can be used indirectly and probably directly in the near future. But we do not know exactly whether the user is willing to accept this and to learn the difficult strategy of such systems. The question is controversial and needs further investigations.

Another problem in this context is the transfer of scientific and technological innovation to users in the industry. The problem is partly solved in the big firms, mainly within fast developing fields such as organic chemistry, electronics, atomic energy, space research, etc. It is not being solved in the small and medium-sized enterprises.

We are looking for systems operated by branch associations for their members and we have started with one regional information office for the special structured industry in the Land Baden Württemberg. In this field we have to learn from the experiences in the UK, especially from Aslib itself. Therefore, for this and many other reasons I can only hope for a fruitful and continuing co-operation with all of you.

DISCUSSION

In reply to a request for details of the mathematical content of training courses for documentalists, DR CREMER said that courses for medical documentalists included sufficient mathematics to enable them to handle medical statistics, but that generally mathematics was not a part of the curriculum for general documentalists. However, a one week course on computer mathematics had recently been run for documentalists concerned with computer programming.

MR B. T. STERN (Wellcome Foundation) commenting that in the UK and elsewhere information workers and services were vulnerable to cutbacks in periods of slow economic growth, asked to what extent documentalists in Germany would be regarded by Government and industry as playing so vital a part that they would not be similarly vulnerable.

DR CREMER replied that, hopefully, the situation would remain as good as it is now. The policy was to convince science and the public that information is part of science policy, essential to research administration.

MR S. FRANCIS (Northern Polytechnic) asked how far the EEC was a viable grouping for information and documentation work.

DR CREMER replied that the accession of UK and other countries would greatly strengthen the information activities within the EEC. He hoped that the influence of the Community in the world would lead to a stronger international information network. Further, the economic strength of the Community could facilitate the set-up of networks to exploit the major information services on behalf of the member nations.

DR H. COBLANS (Independent) wished for some discussion of the problems arising from the relationship between the Federal and Länder authorities.

DR CREMER said that in principle there was no problem, other than some competition in the education (particularly the university) field.

THE INFORMATION SCENE IN BRITAIN AND GERMANY

2. Information in Britain

WILFRED ASHWORTH

Chief Librarian, Polytechnic of Central London

Paper presented at the 45th Aslib Annual Conference, Darmstadt, West Germany, 10th–14th October 1971

LOVE OF THE PAST is one of the key features of the British character. Tourists who flock to our shores see it in our carefully-preserved archaeological sites, ancient monuments, churches, castles, palaces and timbered buildings. During their visit they may even learn from the guides that tradition is so important to us that its continuance may acquire legal force. If an individual can prove that he and his predecessors have enjoyed a privilege for a certain length of time he may be granted leave to enjoy it in perpetuity, as, for example, by our laws of ancient lights and right of way. In spite of evidence of this kind foreigners usually still fail to understand how fundamental tradition is to our nature and how much we respect our long-standing institutions. Thus, in order properly to understand the present state of the information industry in Great Britain it will be necessary to examine its historical growth. As with most British institutions it owes much to the circumstances of its development.

Though information services in this country now cover all fields of interest, the causative factor in their birth was the need to solve problems arising from the rapid growth of scientific and technical knowledge and especially from the manner in which that knowledge was communicated. There is no need for this paper to cover the period from the beginnings of science and through the Middle Ages up to the formation of the Learned Societies and the invention of the scientific periodical. This has already been done concisely and well by Professor Andrade in his opening lecture to the Royal Society's Scientific Information Conference of 1948. The major countries of Europe were running neck and neck in their development and the situation was one in which similar advances were made quite independently at more or less the same time. Although we in Britain were some years behind Italy in the foundation of a major scientific Society, at least our Royal Society has endured. So has its *Transactions* which started just a few months behind *Journal des Sçavans* which is accepted as the world's first scientific periodical. Germany's abstracting periodicals pre-dated ours by about two years, but in popularization of science we led the world with the publication of *Nature* in 1869. The new scientific literature by its character and quantity soon presented problems of handling which, as we know, led to the development of libraries of a new kind.

There seems a good deal of doubt whether we have to give priority to the United States for the first development of privately-owned special libraries but we were early in the field if the Mechanics Institutes, first founded in 1824, can be regarded as incunabula. Margaret R. Marshall in her Library Association Fellowship thesis on the history of industrial libraries in Britain shows that in the early 1850s a number of private companies introduced libraries for the moral, spiritual and educational benefit of their workpeople and at least some of the books provided would doubtless have dealt with the techniques of the industry concerned. The first purely technical industrial library of which she was able to find evidence was that of Levinstein Ltd, which began as a small collection of essential periodicals and books housed in a room next to a laboratory. By a series of mergers this company eventually became ICI Dyestuffs Division which still owns the original periodical sets, dating from the 1870s, from Levinstein's Library. Other firms were collecting similar material in this way at about the same period. Dr F. Hurter, first Research Manager of the United Alkali Co. on its formation in 1891, was able to start a library by putting together books and papers collected from the constituent firms in the new group. The design library of John Crossley and Son of Halifax dates from 1880, but this firm had a library for its workers from 1859. In general the early technical literature collections were formed on the personal initiative of a member of the research staff of a company who assumed part-time responsibility for them. It was not until 1910 or a little later that one or two such collections became the full-time responsibility of someone who would be called a librarian. A notable example was at the Nobel Explosives Company of Ardeer which founded its library in 1909, and, in the following year, brought in J. Kaiser, Chief Bibliographer of the Engineering Societies Library in New York, to introduce his system of indexing. This system, dependent on the use of catchwords with a rudimentary faceted control and a rigid preferred order, was supervised by a committee of users whose decisions were carefully recorded. It was to have a profound influence on special libraries because it set a standard of detailed indexing which many others followed, whether they adopted Kaiser's system or not.

Europe certainly has to give priority to the United States in the first use of the term 'special library' and the establishment of an association of special libraries. This grew out of the American Library Association which, founded in 1876, preceded ours by one year. The American National Association of State Librarians was founded in 1889, the Medical Library Assocation in 1898, and the American Association of Law Librarians in 1906, but these were more associations for specialist librarians than for special librarians as we now know the term. It was early in 1909 that an informal conference held at a meeting of the New York and New Jersey Library Associations resulted in letters being sent to appropriate libraries suggesting a gathering during the July meeting of the American Library Association. This gathering, of twenty-six librarians, decided that 'the demand of their jobs had actually created a new kind of librarianship—that of library service geared to meet the needs of specialized situations' and the Special Libraries Association was formed. It is interesting to note that the initiative came largely from librarians of specialist departments in general libraries and not from staff of the few true special libraries already in existence. Further development of special libraries in Great Britain after 1910 was spasmodic but a few pioneers in important industries established libraries which were much better organized than those previously in existence. The Metropolitan Vickers Electrical Company Library, for example, was founded in 1916 under Dr J. G. Pearce, a technologist who was soon to play a dominant role in the development of special libraries in Britain. His assistant was a trained librarian. The Library of the Rowntree Cocoa Works at York was started in 1917, the directors of the company having first sought advice from an American industrial librarian. Their first librarian, H. V. Garrett, though he had no library training, proved not only to have a natural aptitude for the work but to be able to foresee its potentialities. He has been described as a good publicity man whose enthusiasm was communicable. He sought help from other libraries, both special and public, introduced the Kaiser system which he had seen in use at Nobel Explosives and then passed on his experience by giving lectures and advising other firms on setting up libraries. At this time the approach to industrial librarianship was largely empirical, there being little in conventional librarianship as then taught to help the special librarian to cope with the detailed indexing which was found to be necessary or with the active role of dissemination. So shared experience was the only way of making useful progress and informal contact the only means.

Before the first World War the Government had given no encouragement to firms to establish research departments or libraries. In 1915, however, the need for research began to be realized. The Advisory Council for Scientific and Industrial Research followed a year later. One million pounds, then a substantial sum, was voted to set up a series of co-operative industrial research stations. Though in their early years these had difficulty in securing support also from industry, three in particular, the British Cotton Industry Research Association, the British Cast Iron Research Association, and the British Non-Ferrous Metals Research Association, established substantial and active libraries and were to play an important part in advancing co-operation between special libraries.

Indeed the time was ripe, if not over-ripe, for the establishment of special librarianship on a more formal basis. In 1918 the Faraday Society held one of its general discussions on the co-ordination of scientific publications and brought a number of librarians together. In December 1919 the Conference of Research Associations of DSIR had information bureaux as one of its main themes. In 1922 the Library Association Annual Conference carried a section on industrial libraries. But all these were *ad hoc* efforts and the first real move towards formal association came when Dr J. G. Pearce, who had just been appointed Director of the British Cast Iron Research Association, together with R. S. Hutton and A. F. Ridley, Director and Librarian respectively of the British Non-Ferrous Metals Research Association, planned a convention of those in charge of special libraries and of others concerned with the collection and utilization of information. Dr Pearce had just attended the Special Libraries Association Conference at Atlantic City in 1923 and Dr Hutton had studied technical libraries on visits to America and they were impressed by what they had seen. In planning the conference, to quote Dr Hutton's own words:

> we had prominently in mind two vital problems which faced industrial research associations but which appeared to us to be common to both scientific and humanistic enterprises how-

> ever diverse their individual professional interest might be. These twofold tasks were: how to make as complete as possible a survey on some special subject from world-wide sources, and how to bring the more important results of the survey to the attention of members of the organization, however unwilling or inexperienced they might be, at first, to utilize the knowledge so gained.

My reason for quoting this passage is to draw attention to four points which had a formative influence on subsequent information-work in Great Britain. These are:

1. that information problems were common to both humanistic and scientific enterprises;
2. that world-wide sources would have to be tapped;
3. that there is necessity for selection and evaluation of information before it is presented; and
4. that emphasis must be placed on active dissemination.

These principles, so clearly laid down at an early stage in information technology, have remained the charter for British information services.

The Conference, financially assisted by the Carnegie United Kingdom Trust, was held in September 1924 at High Leigh, Hoddesdon. Ridley was the Organizing Secretary and eighty-four people attended. Some idea of the determined activity of this conference was given by Hutton who reported that its first session on the Friday evening lasted until 10.30 and that there were only short intermissions for sleep and meals until after breakfast on the Monday. A Council or Standing Committee was formed including amongst its members W. Barbour of Nobel Explosives, H. V. Garrett of Rowntrees, J. C. Withers of the Cotton Industry Research Association and, of course, Hutton, Pearce and Ridley. Amongst professional librarians taking part were E. Wyndham Hulme, B. M. Headicar, Stanley Jast, S. C. Bradford and E. A. Baker all of whom continued to play an important part in stimulating special librarianship. There was insistent demand for continued co-operation, although those who attended emphasized that they had no intention of proposing the formation of a new society and that they hoped for co-operation with the Library Association. However, in May of the following year the Committee took the name of Association of Special Libraries and Information Bureaux. It is interesting to note that the definition of a special library used, but never formally adopted, was 'a collection of information covering a special subject or field of activity and in charge of someone trained in its application'.

The position of the founders of the new Association in relation to the Library Association has never been clearly established. E. Wyndham Hulme in discussion at High Leigh mentioned that some seven or eight years earlier the Library Association had contemplated the formation of a special section. However, from news items in the *Library Association Record* of the period it would seem that Hulme was mis-remembering. The proposal had been for a society or club for non-municipal librarians, especially for the senior officers of state, university and professional associations. Dr Hutton's opinion was shown by his response to a suggestion that it would have been better to link the conference with one of the Library Association meetings. 'Whilst having a great respect for the professional librarian my view is', he said, 'that for the moment we need to discuss these questions in an entirely independent meeting so as to mobilize the interest of a wide field of library users'. Although very friendly meetings were held with the Library Association in October 1924 and again in 1925, 1928 and 1930, this seems to have become the official view and Dr Hutton, looking back in 1945, concluded that it was the novel aims and the diversity of qualifications and interests of Aslib supporters which made it difficult for either side to formulate any acceptable proposals for union. It appears to have been decided that both Associations would lose more than they could possibly gain by amalgamation.

Whether this was true or not the historical fact is that Aslib was incorporated as an Association on 30th November 1927 and special librarianship in Britain, as in the United States, began to develop apart from the existing association of librarians. There was a more profound result of this in Britain, however, than in America where a higher proportion of the staff of special libraries had formal library training. Sufficient time has now elapsed to make a reasoned judgement. On balance it was probably good, rather than bad, that development should have taken place in this way. The new approach to information benefited from uncommitted minds. Information workers had to create new systems to meet the new needs and although some were re-invention of established library methods others were novel. It will be remembered that the Kaiser system, with its semi-faceted basis and a measure of vocabulary control, had established a firm hold amongst indexers, which it could scarcely have done amongst librarians whose attachment to conventional subject-heading was too strong. When classification made its mark it was the Universal Decimal Classification which came with keen backing through the influence of Professor Pollard and Dr S. C. Bradford of the Science Museum Library. It would not have been a likely choice for librarians to make at that time and it brought with it the new concept of total documentation and a crusading fervour which only the older people in this room will still remember. If, at a conference in those days one had at 2 a.m. to bang on the thin dividing walls of the hut bedrooms it was sure to be to stop somebody arguing about where he intended to put some minute branch of technology in *his* version of the UDC tables. We no longer believe it possible to create a world bibliography on cards but in those days many librarians did and its quest, if as intrinsically hopeless as that of the philosopher's stone, was necessary to the alchemy of special librarianship. Unfortunately the two-Association situation had bad as well as good consequences. Though the *associations* have never failed to respect each other, or to collaborate usefully, many individual librarians and information officers began a stupid controversy which lasted for many years and divided the profession. It concerned the questions whether subject-knowledge or librarianship were better qualifications for success in special library work, and whether special librarianship was in fact different in nature from librarianship. Fortunately there were sufficient of both non-librarians and librarians who were content to remain aloof from the controversy while continuing to run the highly effective information units they had established, proving that in reality personal characteristics like a keenness to serve and a flair for handling information were dominant factors for success under the exacting conditions of a pioneering situation. The Association of Special Libraries and Information Bureaux, too, provided exactly the right kind of channel through which the growing number of special libraries could share their experience without feeling that their problems might be thought trivial—there are times when the blind prefer to be led by the blind! In this manner a spirit of mutual help arose which soon extended to exchange of non confidential information as well as shared techniques. This voluntary network of co-operation between a large number of small subject-oriented information units is characteristic of the British information scene and is the secret of its success. Voluntary collaboration comes naturally to us, who will gladly help others just as long as we are not coerced to do so. Some idea of the extent of this co-operation can be gained from the fact that before the establishment of the National Lending Library made borrowing so much easier, the number of interlibrary loans between special libraries, entirely on a voluntary basis, was estimated to be as great as the number of loans made by the National Central Library and regional systems together.

The 1930s had been difficult years for special librarians most of whom were not only involved in doing the work but had constant need to justify their existence to management. Yet the numbers of such libraries steadily rose through the publicizing efforts of some of the inspired librarians of the period. I am not going to embarrass my friends by referring to any who are still engaged in the work, but cannot resist mentioning people like Benjamin Fullman, Miss E. M. Parker, Dr V. E. Parkes, Eric N. Simons, Frank Newby, and R. Brightman who befriended me when I first became a special librarian and whose pioneer influence was immense. And having said their names I realize that not one of them was a trained librarian! The 1930s were also difficult years for Aslib. Miss E. M. R. Ditmas became its General Secretary in 1932 at a time when, to use her own words, it touched the lowest ebb of its fortunes. Indeed Dr Hutton remembers that there were times when she had to finance the Association rather than the reverse—yet, as she wrote from their one small room on the top floor of a tall Bloomsbury House, so cramped that some furniture had to be moved out on to the landing to open the cupboards, 'we sat at the centre of a spider-web of contacts with a vast range of sources of information'—a significant phrase showing how well-established informal contacts had already become.

It would be quite impossible for me to bring you to any but the most superficial understanding of the British information scene without reference to the contribution made by Miss Ditmas. From the very start she was able to involve herself with the aims and objects of Aslib to the point of identification with them. She nursed the Association through its most difficult days and at times during the second World War ran it single-handed. Under her control a publications programme was started, the translations panel established and membership steadily increased. She established the Aslib Microfilm Service, superintended moves to larger and still larger premises, and developed important international contacts. Special librarianship had by now become established as a moderately-sized profession with its own association, but it still lacked ground support. One is reminded of the lady driver who took her car into a garage for a refill. 'Do you know, madam,' said the attendant, 'that you have a flat tyre?' She got out to look and, wringing her hands, said, 'Oh! dear! and it's the part on the ground which has gone down'. Support for special librarianship was, however, forthcoming. Up to this time government influence had been mainly confined to the development of its own departmental libraries and the libraries of the research associations. Now DSIR agreed to subsidize Aslib by a direct grant system like that adopted for research associations and for the first time the Association was on a really sound financial footing. Then the Royal Society took a hand and called a Scientific Information Conference which took place in London in 1948. The conference itself has now been largely forgotten, the working parties it set up faded away rather quickly, few of its recommendations were directly implemented, but it had an immensely seminal effect on information services and on the many delegates, both information workers and users, who attended. Our Royal Society has a wonderful capability of conferring an aura of venerable respectability on anything it touches and this was no exception. Information had 'arrived'.

I have talked with many of my colleagues and have been interested to discover that their assessment of the Royal Society's Scientific Information Conference is the same. All point to some resulting change in their approach, all learnt something from it. In my own case I found myself intensely irritated by the acid divergence of opinion on the librarian/information officer controversy and vowed to do all I could to bring about integration between them and my colleagues have been kind enough to acknowledge that I have had some influence in helping to unite the profession.

I have spent so much time on the early and formative phase of special librarianship in Britain that I shall now have to skip rather quickly through the more recent period which is, however, well known to you. Aslib went from strength to strength with continual and increasingly rapid growth in membership. An education department was introduced to provide short courses and some members thought this ought to lead to the granting of qualifications. An attempt made at the 1958 AGM to establish Aslib as a qualifying body was, however, defeated. Some of the prime movers, believing that a new qualification was essential, founded the Institute of Information Scientists to represent the particular interests of qualified scientists engaged in information work. Thus we now have three separate bodies which in different ways and with differing emphasis represent the interests of information workers and special librarians in Britain.

The Subject Groups of Aslib, which were first introduced in 1952, were constituted to provide a forum for exchange of information and mutual help, but because they had only a tenuous connection with headquarters they strengthened, and did not depart from, the dependence on *voluntary* collaboration which had proved so successful.

At this time work had been begun at the Science Library which was to have an unexpectedly strong formative influence on special librarianship. Investigation was carried out on the use which scientists made of the Library and the way in which they found references to articles in periodicals. The idea that library usage and processes could profitably be investigated and needs measured scientifically was then entirely new. Its effect was to take some of the mystique out of librarianship and to create an attitude of mind which was open to the idea of research.

A pressing information problem in Great Britain, highlighted in the early 1950s, was that of the many industrial firms which were too small to set up their own viable information units. The problem has still been only partially solved. The research associations play some part, especially since the compulsory levy allowed by the Industrial Organization and Development Act of 1947 means that even the smallest firms in an industry have a right to their services. The regional co-operative schemes, originated as long ago as 1932 in the Sheffield Interchange Organization and now widely established under a variety of pronounceable acronyms, also play their part, as do the Industrial Liaison Centres established in technical colleges. Finally, our public libraries have in recent years greatly increased their holdings of industrially useful material.

Perhaps belatedly the Library Association began to take more than a spasmodic interest in special librarianship when, in 1950, the Reference, Special and Information Section was formed for the increasing numbers of chartered librarians working in special libraries. In 1962 special librarians obtained their own committee of Council. The extent to which the Association's concern with special libraries has progressed is shown by the fact that it was the Library Association rather than Aslib which set up and financed an independent committee of users and librarians to report, in 1968, on the scientific library services of the country.

The last few years have brought a number of changes to information in Britain. We have seen the effect of the establishment of the Advisory Committee for Scientific and Technical Information to advise the Secretary of State for Education and Science on the conduct of, and support for, UK activities in scientific and technical information over the whole field of natural and social sciences and their related technologies. It advises on the work of the Office for Scientific and Technical Information, which replaces the 'information' activities of the earlier DSIR. OSTI, by a series of substantial grants, has supported investigations into the use of computers for the handling of bibliographical information, especially for selective dissemination of information. Under OSTI's aegis specialized information centres have been set up to cover five fields of interdisciplinary technological activity and data centres to cover four fields. Many smaller projects have also been financed for research into library and information work. An experiment is under way to assess the potentialities and role of information officers in university libraries. Finally OSTI has taken a direct interest in the education and training of information workers and special librarians. It is interesting to note that expenditure on OSTI grants rose from £117,000 in 1965–6 to £517,000 in 1969–70. In the last few years, too, diversity of training for librarians has been introduced and rapid strides made towards librarianship becoming a substantially graduate profession, a change from which special librarianship in particular is likely to benefit.

While necessarily limited by shortage of time to a few quick dabs at an extremely large canvas I have tried to give an impression of the formative factors which have led to the present position of the information industry in Britain. The way in which services grew up by empirical development and mutual help created a pattern of small subject-oriented units linked by a voluntary network of co-operation. Each can cover its marginal topics and other subject fields to a high level of expertise at the expense only of a telephone call or letter and willingness to provide a similar service for others. This has proved to be a remarkably cost-effective method of approach which admirably suits a geographically compact country in which a high proportion of industrial effort is still based on small firms. As I have shown, our formal associations of special librarians, our research associations, regional schemes, liaison centres and subject groups have served only to *channel* or *focus* voluntary effort, not to replace it.

But is this a stable situation? There have recently been diquieting developments which could disturb the present successful pattern. The changes have so far been most marked in the industrial library sphere where, as a result of mergers and take-overs a number of libraries have in the so-called 'interests of economy' been condensed into larger centrally-operated units. The resulting redundancy amongst special librarians has had serious repercussions on the stability of this section of the profession and will certainly make the future recruitment of the right kind of person more difficult. But there are other implications which might prove even more grave. There could be a reduction in co-operative effort if too many small units are swallowed up in large groupings. There is a known tendency for larger companies to regard themselves as self-sufficient in their information coverage, an attitude which discourages the making of contacts and inhibits co-operation. There has undoubtedly been a loss of effectiveness through the remoteness caused by centralization and a loss of close touch with the interests of individuals, especially those at the periphery of the organizations. This has led to a loss of confidence in library services within some of the largest and most influential companies—a disenchantment which could become infectious. There are already signs that individual research workers are turning away from libraries and towards commercially-provided data services and SDI information packages. Some of these are of decidedly indifferent quality in all respects except that of their own persuasive advertising. A further factor of change, explained as a need to increase speed and cost-effectiveness, has been a demand for computerization of information services, especially directed towards large-scale and all-embracing retrieval systems which would not require intellectual effort in indexing and could therefore replace information officers. Examined critically this is a reversion to the belief in total documentation. There has already been one unsuccessful attempt to provide a pan-bibliographical service but it has apparently already been forgotten how far short of predicted usefulness the resulting lists of references proved. The whole system became, like the dinosaurs, a victim of its own ponderous size.

Although computers offer many orders of difference in their speed of operation and storage capacity, we should not ignore the entropy factor of information—that the sum total of knowledge must continuously increase and eventually set a limit on the capacity of any total documentation system. Nor can we lightly ignore the fact that all experience so far available shows that, as before, the output to the user has proved to be far less acceptable than predicted. To achieve even moderate recall and relevance the new systems require a higher degree of manual intervention than had been expected. Computers undoubtedly have their value in giving rapid access to data but when ideas are needed to stimulate innovative research it is still necessary to turn to the information officer. I believe this human factor to be so fundamental to the future of information work that I make no apology for repeating ideas which I have already expressed elsewhere. Study of the innovative process in the human mind shows that all new technological and many artistic and scientific concepts arise, by association, from what is already known, and particularly by combination of two or more previously unrelated ideas. The mental processes of a trained information worker in close touch with an enquirer are able to recognize potentially useful associations and correlations apt to the particular situation. Further, the would-be total documentalist must beware of the trap in the classical view that each and every question has its own correct answer. In reality there may be a number of valid and acceptable answers to each problem and these have to be evaluated in the light of the full background to the situation and the relative cost and potential for success of following up each solution. This selection and evaluation is well within the compass of a trained information officer but is at present outside the range of automation. Finally, I have pointed out to the pessimists who bewail the information explosion and moan about the impossibility of scientists keeping up to date with the literature, the irrelevance of their worry. It is relatively easy for any one individual to obtain as much information as he has time or opportunity to use. The secret of the information officer's success is his ability to select for this individual the most profitably useful available information, while spending the least amount of cost, effort and time on the selection

I am driven inexorably to the conclusion that the future of special librarianship must still rely on the personal aspects of the service. My experience as an information worker extends now over some thirty-five years, during which the importance of personal service appears to me to have grown rather than diminished. Experience in Britain has demonstrated that every information unit needs a continuous infusion of enthusiasm from *someone*—someone who believes in the work and who is able to identify himself with the needs of his users. Once a service becomes impersonal or distant a vital link is broken.

Information in Britain as it stands at present owes a great deal to its enthusiastic and far seeing pioneers and to the co-operative spirit which, by necessity, grew up between them. We must be careful lest, in the name of progress, we depart too widely from a successful pattern.

CURRENT AWARENESS LIST

Recent additions to the Aslib library catalogue are broken down into twelve broad groups, whose coverage is indicated below. These groups are not mutually exclusive but it is hoped that users will find them helpful in scanning for new items of interest.

User Studies
Analyses of information-seeking, literature-use and library-use patterns; user training.

Communication and Knowledge
Flow and organization of knowledge, including national policies; information theory.

Information Processing Systems
Dissemination, processing, storage and retrieval techniques and systems; data centres; management information systems.

Language and Indexing
Linguistics, semantics, nomenclature, terminology; subject headings, thesauri and their construction; indexing; abstracting; translating.

Classification and Cataloguing
Documentary and non-documentary coding; cataloguing; filing.

Mechanization
Automation in libraries, broadly, including 'housekeeping' procedures; machines applicable in libraries; computer technology.

Subject Organization
Special libraries and specialized documentation centres; sources of information including reference books and bibliographies; reference and inquiry work.

Reprography
Materials, methods and systems; facsimile transmission; telex.

Printing and Publishing
Writing and editorial work; printing and publishing; periodical references and citation patterns; bookselling; copyright; legal aspects of computerized information.

Administration and Management
Special library and information service policy, buildings, furniture and staff; stock including special materials; lending and journal circulation.

Library Systems
National libraries; general libraries and documentation centres; university and college libraries; inter-library co-operation.

Professional Activity
Library science, information science, documentation; professional associations, education, literature, organizations and research; biographies; directories.

JANET WALKLEY
Librarian

CURRENT AWARENESS LIST

Items are available in the Aslib Library and may be borrowed unless marked to indicate reference copies.*

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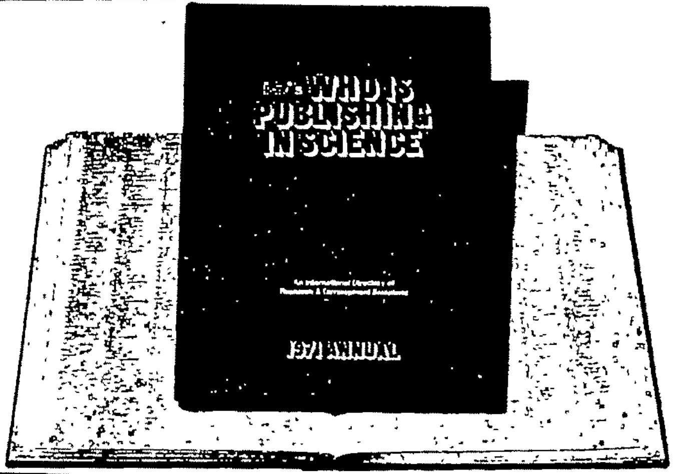
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